OCT-15-1999 13:05 FROM

Army 46 Stake

ORDER FOR SUPPLIES OR SERVICES

(Contractor must submit four copies of invoice.)

Form Approved OMB No. 0704-0187 Expires Jun 30, 1997

PAGE 1 OF 2

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SEND YOUR COMPLETED FORM TO THE PROCUREMENT OFFICIAL IDENTIFIED IN ITEM 6.

1. CONTRACT / PURCH ORDER NO	2. TASK ORDER NO.	3. DATE OF ORDER	4. REQUISITION / PURCH REQUEST NO.	5. PRIORITY
DACA87-97-D-0066	0002	10/15/99	W31RYO-PTLE-ONWD	

6. ISSUED BY CODE 8031

US ARMY ENGINEERING & SUPPORT CENTER
ATTN: CEHNC-CT-A/C. SARGENT
P.O. BOX 1600
HUNTSVILLE AL 35807-1957
Carol Sargent A02 (256) 895-1124

7. ADMINISTERED BY (If other than 6) CODE 8031

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8. DELIVERY FOB
☒ DEST
☐ OTHER (See Schedule if other)

9. CONTRACTOR Vendor Id: 00001386 CODE 0EBY3 FACILITY CODE

NAME AND ADDRESS
SEMPRA ENERGY SERVICES
ATTN ERRIN KEITH
2500 CITY WEST BOULEVARD SUITE 1800
HOUSTON TX 77042

10. DELIVER TO FOB POINT BY (Date) 140CT31

11. MARK IF BUSINESS IS
☐ SMALL
☐ SMALL DISAD-VANTAGED
☐ WOMEN-OWNED

12. DISCOUNT TERMS 0% 000 Days Net 030

13. MAIL INVOICES TO See Block 15

14. SHIP TO CODE EMPTY

FORT LEONARD WOOD MO DACA8797D0066

15. PAYMENT WILL BE MADE BY CODE EMPTY

DFAS Lawton, Fort Sill OPLOC
ATTN: DFAS-LW-FPV
4700 Mow Way Rd/Dept 1791
Fort Sill, OK 73503-1791

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16. TYPE OF ORDER

DELIVERY — This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.

PURCHASE X — Reference your furnish the following on terms specified herein. ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

Sempra Energy Services Co. — NAME OF CONTRACTOR

B.N. Tripathi — SIGNATURE

B.N. Tripathi, President — TYPED NAME AND TITLE

10/14/99 — DATE SIGNED (YYMMDD)

☒ If this box is marked, supplier must sign Acceptance and return the following number of copies: 1

17. ACCOUNTING AND APPROPRIATION DATA / LOCAL USE

Award Oblig Amt US$ 0.00

XXX TOTAL PROJECT COST: $3,385,526.00

18. ITEM NO.	19. SCHEDULE OF SUPPLIES / SERVICE	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	All work to be performed in accordance with the attached Scope of Work, dated 24 September 1999 and the CES/Way Fort Leonard Wood proposal dated July 28, 1999, which is referenced but not incorporated into this task order award. *****Payment will be monthly for a total of 15 years. The total annual payment is $498,119.0, monthly payment				

*If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA
By: Donna Bliss 315 — CONTRACTING / ORDERING OFFICER
10/15/99

25. TOTAL $ 0.00
26. DIFFERENCES
30. INITIALS

26. QUANTITY IN COLUMN 20 HAS BEEN
☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

DATE — SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

27. SHIP. NO. ☐ PARTIAL ☐ FINAL

28. G.O. VOUCHER NO.

32. PAID BY

33. AMOUNT VERIFIED CORRECT FOR

31. PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL

34. CHECK NUMBER

35. BILL OF LADING NO.

36. I certify this account is correct and proper for payment.

DATE — SIGNATURE AND TITLE OF CERTIFYING OFFICER

37. RECEIVED AT	38. RECEIVED BY (Print)	39. DATE RECEIVED (YYMMMDD)	40. TOT. CONTAINERS	41. S/R ACCOUNT NUMBER	42. S/R VOUCHER NO.

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OCT 15 1999 12:50

SEMPRA ENERGY SERVICES

will be approximately $34,009.92. Payment will be in accordance with the terms and conditions of the basic contract, the attached Scope of Work, and the Fort Leonard Wood proposal Section 3, Financials and Appendix I.

The termination schedule is located in Appendix K of the referenced proposal.

Davis Bacon Wage Rates will be utilized for this Task Order.

Performance and Payment Bonds are required and Notice to Proceed with construction will not be issued until bonds are received by the contracting office.

Total Project Cost is $3,385,526.00.

NOTE: This task order is issued pursuant to the authority granted to the Government by the Energy Policy Act of 1992 (P.L. 102-486), Executive Order 13123 and 10 USC 2865, for the purpose of reducing energy consumption and energy costs. Notwithstanding any provision of Contract No. DACA87-97-D-0066 including the following contract clauses: Availability of Funds clause (52.232-19), Cancellation Under Multi-Year Contracts clause (52.217-2), and Termination for Convenience clause (52.249-2) thereof, the Government represents that is has multi-year authority with respect to this task order, and that prior to any termination for any reason under this contract, the Government will have funds available to pay all termination costs as defined by the termination schedule (Appendix K). The Government recognizes that it will incur a gradually declining liability. In the event of any early termination, the Government obligation for payment shall be determined using the termination schedule defined above.

24 September 1999

DACA87-97-D-0066
TASK ORDER 2

SCOPE OF WORK
REPLACEMENT OF AIR-COOLED CONDENSING UNITS AND INSTALLATION OF WATER SAVINGS DEVICES IN THE FAMILY HOUSING AREA
FORT LEONARD WOOD, MO

1.0 GENERAL REQUIREMENTS

1.1 Sempra Energy Services shall perform Task Order #2 Replacement of air-cooled condensing units (ACCUs) and the installation of water saving devices in the family housing units in accordance with this scope of work and the back-up data supplied July 1999 as Transmittal 99-FLW-2.

1.1.1 Due to the anti-deficiency act, if it is determined as a later date that the amount of savings calculated in a proposal are incorrect, then the savings/payments must be modified to account for the disparity and to comply with the anti-deficiency act.

1.1.2 During the implementation of this task order, the Government reserves the right to examine the performance of the installed equipment. If the performance of the equipment is questionable due to factors within the contractor's control such as but not limited to the contractor's performance of maintenance, misrepresentation of equipment, or improperly installed equipment, the Government will require the contractor to measure the equipment performance. If the equipment is performing as indicated in the contractor's proposal, the task order will be modified to pay the contractor for the agreed upon fair and reasonable cost incurred for the testing. If the equipment is not performing as indicated in the contractor's proposal, the contractor shall perform the testing at no additional cost to the Government. If the equipment does not meet the required performance parameters, either the contractor shall modify the equipment to meet the performance parameters indicated in the proposal or there will be a modification to the contractor's payment to reflect the equipment's actual performance as mutually agreed upon by the Government and the contractor.

1.2 The objective of this Task Order is for Sempra Energy Services to provide all labor, materials, and equipment necessary to complete the following projects in accordance with all installation, State, and Federal codes and laws. To accomplish this objective Sempra Energy Services shall adhere to the following:

1.2.1 Sempra Energy Services shall coordinate all work schedules with Fort Leonard Wood at least one week in advance of performing any work. Sempra Energy Services shall receive acceptance of the work schedule from Fort Leonard Wood prior to beginning construction.

1.2.2 Sempra Energy Services shall reuse components which are verified as in good condition and dispose of other removed equipment, parts and debris, as instructed by installation personnel in accordance with installation, local, State, and Federal regulations. This includes disposal of equipment containing PCB material and or other hazardous material that must be disposed in a licensed hazardous waste facility approved for hazardous material storage.

1.2.3 Sempra Energy Services shall restore each work site to its original configuration including replacement of or repair of items damaged, modified or removed, during the project outside the scope of this Task Order, at Sempra Energy Services's expense.

1.2.4 Sempra Energy Services shall allow Fort Leonard Wood to retain any reusable equipment/items that are removed and not needed to implement this task order.

1.2.5 Sempra Energy Services shall coordinate all construction activities with the facility in advance prior to formalizing them in a schedule to assure continuous uninterrupted operation of the building.

1.2.6 Sempra Energy Services shall attend weekly or biweekly construction meetings as mutually agreed between Sempra Energy Services and the facility personnel. The attendees for the meetings should include the facility personnel, quality control personnel, and subcontractor personnel. Sempra Energy Services shall provide minutes of the meetings to all attendees. Sempra Energy Services shall also maintain project status of the Task Order with the facility by identifying percentage of project completion.

1.2.7 Sempra Energy Services shall identify all existing asbestos material for this Task Order, which would be disturbed as a result of this Task Order. Sempra Energy Services shall certify that all asbestos has been removed in accordance with an approved asbestos plan prior to the beginning of any work on this Task Order.

1.2.8 Sempra Energy Services shall identify all contractor operation & storage areas that will be utilized during construction. Sempra Energy Services

shall identify the contractors' field offices location including sanitation and utilities.

1.2.9 Sempra Energy Services shall be responsible for identifying and obtaining all necessary facility, state, and federal permits that will be required before performing any work on this Task Order.

1.2.10 Sempra Energy Services shall ensure products provided under this contract, to include hardware, software, firmware, and middleware, whether acting along or combined as a system, are Year 2000 compliant as defined in FAR Part 39.

1.2.11 Sempra Energy Services shall be responsible for the all risks within their control associated with savings performance of all projects. The Government shall be responsible for the savings risks associated with the unit cost of energy and the hours of operation and usage of the facility. If at any time during the term of the contract, the projects do not create sufficient savings on an annual basis to fund the contractors payment for reasons within the Government's control or if energy unit prices change, then the Government is obligated to pay the contractor as agreed or renegotiate the payment and term in a form mutually agreeable to both parties. If at any time during the term of the task order, projects do not create sufficient savings on an annual basis to fund the herein indicated contractor payment for reasons within the contractors control, then the payment due the contractor will be limited to the actual savings generated by the project as determined utilizing the unit costs of energy and the hours of operation indicated in of the contractors proposal. Sempra Energy Services shall be responsible for but not limited to the assumptions and projections of savings, proper design, proper construction, and proper maintenance and repair of systems for which they have maintenance and repair responsibility.

2.0 SPECIFIC REQUIREMENTS

2.1 Replacement of Air-Cooled Condensing Units (ACCUs) and Installation of Water Saving Devices

2.1.1 Sempra Energy Services shall replace the air-cooled condensing units (ACCUs) and install the water saving devices in the family housing area in accordance with Task Order #2 Replacement of air-cooled condensing units (ACCUs) and Installation of water saving devices in the family housing area for Fort Leonard Wood and this scope of work.

2.1.2 The installation costs associated with the air-cooled condensing units (ACCUs) and the water saving devices for the family housing area included in Task Order #2 are listed in section 3 Total Project Costs of this scope of work. For more detail refer to the backup data.

2.1.3 Sempra Energy Services will develop a baseline and post installation energy usage for the air-cooled condensing units (ACCUs) and the water saving devices in the family housing area based upon section 2.3 of the backup data Transmittal Number 99-FLW-2.

2.1.4 Sempra Energy Services shall develop and maintain a detailed accurate inventory data list for all new equipment installed at Fort Leonard Wood. This detailed inventory list shall be submitted by Sempra Energy Services to the Government. This information will be incorporated into the final reconciliation report prepared per Data Item Description (DID) BW023, Site Specific ECSM Report.

2.1.5 The payment due to Sempra Energy Services will be limited to the actual savings generated. These savings will be determined by the energy cost savings determination methods as described in section 2.3.4 of the backup data Transmittal Number 99-FLW-2.

2.1.6 Sempra Energy Services will not perform maintenance and repair for all installed equipment under this Task Order. Fort Leonard Wood's current maintenance subcontractor will perform maintenance and repair for the installed new equipment. If Fort Leonard Wood's subcontractor can not perform the maintenance, Sempra Energy Services will assume maintenance responsibilities at an additional negotiated cost. Sempra Energy Services shall inspect the equipment regularly and notify Fort Leonard Wood in writing of any maintenance deficiencies.

2.1.7 Equipment ownership responsibility and title will be transferred to the Government at time of project acceptance in accordance with the final reconciliation report prepared per Data Item Description (DID) BW023, Site Specific ECSM Report.

3.0 TOTAL PROJECT COST

The installation costs associated with the air-cooled condensing units (ACCUs) and the water saving devices for the family housing area included in Task Order #2 are below. For more detail refer to the backup data.

ECM Direct Cost: $3,116,460
Contractor Design Costs: $57,633

Measurement/Verification Cost: $92,316
Total Construction Cost: $3,266,409
Construction Interest: $69,420
Total Amount Financed: $3,385,526
Annual Energy Savings: $293,023
Annual Ancillary Savings: $116,622
Total Annual Savings: $409,645
Sempra Energy Services % Share of Savings: 99%
Fort Leonard Wood % Share of Savings: 1%
Interest Rate %: 8.158%
Task Order Financing Term: 15 years

4.0 DELIVERABLES

4.1 Sempra Energy Services shall provide, maintain, and execute an approved site safety and health plan in accordance with DID BW010.

4.2 Sempra Energy Services shall provide, maintain, and execute an approved quality control plan in accordance with DID BW009.

4.3 Sempra Energy Services shall provide a work schedule in accordance with DID BW011, Work schedule.

4.4 Sempra Energy Services shall prepare final as-built drawings in accordance with DID BW022, AS-Build Drawings, and submit drawings to the Government.

4.5 Sempra Energy Services shall submit a final site-specific ECSM report in accordance with DID BW023, Site Specific ECSM Report, after completion of the ECSM.

4.6 Sempra Energy Services shall submit shop drawings in accordance with DID BW008 for any changes in material from that previously submitted.

DEPARTMENT OF THE ARMY
HEADQUARTERS
U.S. ARMY ENGINEER CENTER AND FORT LEONARD WOOD
FORT LEONARD WOOD, MISSOURI 65473-5000

REPLY TO
ATTENTION OF

MEMORANDUM OF AGREEMENT
BETWEEN
U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE (USAESCH), KANSAS CITY DISTRICT, CORPS OF ENGINEERS (KCDE), AND THE FORT LEONARD WOOD ARMY INSTALLATION

SUBJECT: Energy Savings Performance Contracting At Fort Leonard Wood, Missouri

I. PURPOSE

The purpose of this Memorandum of Agreement (MOA) is to establish the organizational relationships, responsibilities and procedures of the U.S. Army Engineering and Support Center, Huntsville, (USAESCH) between Kansas City District Corps of Engineers (KCDE) and Fort Leonard Wood (hereafter referred to as Fort Wood) for managing and executing an Energy Savings Performance Contracting (ESPC) program at the Fort Leonard Wood installation. The areas of responsibility and relationships presented herein will provide an effective management approach to support the accomplishment of energy conservation projects.

II. BACKGROUND

On 7 April 1986, Congress enacted legislation that permits Federal agencies to enter into energy conservation contracts. Shared Energy Savings (SES) projects were authorized by TitleVIII, Section 7201, Public Law 99-272 (42 U.S.C. 8287) as amended by Public Law102-486. On 24 October 1992, the concepts and terminology of Energy Savings Performance Contracting (ESPC) replaced SES with the passage of Public Law102-486.

An ESPC program is one where the contractor typically provides for the financing, design, construction, and maintenance for energy saving devices and systems. The contractor receives compensation out of the resulting energy cost savings and ancillary cost reductions.

In order to reduce the time and costs associated with preparing separate contracts for each energy conservation project, USAESCH developed and awarded several Indefinite Delivery/Indefinite Quantity contracts. DOD then provided funding to USAESCH to "jump-start" the ESPC program for DOD agencies. Fort Wood elected to utilize a portion of this funding to initiate the ESPC program at its location. Should sustainment funding from DOD not be made available beyond its inital introductory period, Fort Wood will be required to fund the Corps' reimbursable costs.

III. ESPC PROGRAM

The program provides a method to obtain task orders under a contract for investigation, development, and submittal of measures which will save the Government energy and money. The contractor shall provide the expertise, equipment, and services necessary to identify, investigate, document, design, finance, install, operate (if appropriate), and maintain Government approved Energy Cost Saving Measures (ECSM). In most cases where real property is required to produce savings, the Government will ultimately retain ownership of the property at the end of the ECSM task order period at no additional cost.

Real property is defined as the land and structures owned by the Government. Equipment and furnishings required to make a real property facility usable and are attached as permanent parts of the structure are known as installed building equipment. Installed building equipment is considered to be real property until severed.

Program Description.

USAESCH has advertised and procured multiple ESPC contracts. The program will be a joint effort between USAESCH, the ESPC contractor, KCDE, and Fort Wood. Thus far, a customer needs survey has been completed by Fort Wood and returned to USAESCH. A short list of potential contractors will be made available by USAESCH based on the survey results. This list will be forwarded to Fort Wood for final selection/approval of a contractor. USAESCH will formally notify the contractor of their selection.

KCDE coordinates with Fort Wood and performs the lead role in development of ECSMs proposed by the contractor. The contractor will coordinate all site surveys with the appropriate Fort Wood personnel. Fort Wood will be responsible for directing/coordinating the contractor's ECSM survey activities. The contractor submits a written proposal to USAESCH, KCDE, and Fort Wood. USAESCH performs a general review of the proposal and a detailed review of the economic analysis/viability and the measurement and verification process. KCDE reviews the written proposal for cost and constructability. Fort Wood will review the complete proposal for acceptability to meet installation requirements. If negotiations are necessary, USAESCH will perform the lead role and KCDE and Fort Wood will be involved, if they request. Fort Wood will have approval authority for each task order and may stop the ECSM from further development at any time before award of a task order. No penalty will incur from terminating an ECSM proposal before award. The costs accrued by the contractor up to the point of termination may be recouped if justified. USAESCH will award the task order. USAESCH will appoint a Contracting Officer's Representative at KCDE and at Fort Wood.

There are two methods available to the contractor for developing ECSM proposals. The first method is the preferred or standard process. The contractor elects to accept all the risks of a streamlined approach and proceeds with performing the steps necessary to complete a proposal before submitting it to the Government for review. The second method is an expanded process where Government review and approval of each separate phase is performed before the contractor proceeds to the follow-on phase. In general, the various phases are site survey report, feasibility study, engineering design (may require multiple reviews), and proposal. The expanded method is used for large and/or complex ECSMs where costs and risks are significant. All Government reviews will be performed simultaneously by KCDE, Fort Wood and USAESCH personnel. Prior to negotiations with the contractor, KCDE will prepare a Government estimate regardless of which method is being used. After approval by Fort Wood, USAESCH will award the task orders.

IV. RESPONSIBILITIES

A. The U.S. Army Engineering and Support Center, Huntsville (USAESCH) will:

(1) Serve as focal point for managing, developing, and coordinating all aspects of the ESPC program.

(2) Coordinate with Fort Wood and KCDE to select a contractor. USAESCH will formally notify the successful contractor of the selection.

(3) Provide ESPC training to Fort Wood personnel.

(4) Appoint (including approve) individuals at KCDE selected for Contracting Officer's Representative (COR) for reviews of contractor submittals.

(5) Evaluate feasibility studies and provide a recommendation to Fort Wood. (In the casae of the expanded method, USAESCH will evaluate all contractor submittals for each phase and provide recommendations to Fort Wood.

(6) Evaluate the contractor's proposals for economic viability, acceptability of measurements, and verification plan. Provide review comments to KCDE.

(7) Lead negotiations.

(8) Award task orders for ECSMs

(9) Coordinate Congressional notification for a project or group of projects which have an accumulated value of over $750,000.

(10) Provide Quality Assurance support, as described in Appendix A.

(11) Appoint (including approve) individuals at Fort Wood selected for Contracting Officer's Representative (COR), quality assurance, and safety monitoring and inspection duties.

(12) Delegate COR authority to Fort Wood on awarded task orders.

(13) Coordinate all reviews and ESPC actions described above with KCDE and Fort Wood.

B. KCDE will:

(1) Coordinate the MOA with USAESCH and Fort Wood.

(2) Provide a customer survey to Fort Wood.

(3) Provide qualifications for personnel recommended for COR duties associated with reveiw of contractor submittals.

(4) Participate in contractor selection.

(5) Evaluate site survey reports and provide recommendations to Fort Wood.

(6) Coordinate the review of all contractor submittals with USAESCH and Fort Wood. Collect and coordinate all review comments and forward to the contractor via cover letter signed by the COR.

(7) Evaluate designs.

(8) Coordinate the development of the written ECSM proposal among the contractor, Fort Wood and USAESCH.

(9) Review the written proposal for cost and constructability.

(10) Determine if contractor's costs are fair and reasonable. Prepare price negotiation objectives, if necessary.

(11) Participate in negotiations, as required.

(12) Provide environmental support, if requested by Fort Wood.

C. Fort Wood will:

(1) Have responsibility for providing appropriate environmentally-acceptable sites and process site environmental survey and clearance documentation.

(2) Participate in ESPC training provided by USAESCH.

(3) Obtain project approvals.

(4) Have responsibility for providing documentation required by the National Environmental Policy Act, and any other applicable federal, state, or local environmental laws and regulations.

(5) Have responsibility for handling real estate matters, including access permits, rights-of-way and easements.

(6) Coordinate contractor site visits to potential project locations.

(7) Participate in the task order execution. Fort Wood will:

(a) Make decisions regarding site surveys, feasibility studies and designs.

(b) Assist in evaluating the contractor's submittals/proposals. Provide review comments to KCDE.

(8) Approve the task order terms prior to award.

(9) Submit project status information (to include energy savings data) as part of their submission for annual energy reports to higher authorities.

(10) Provide qualifications or personnel recommended for COR, quality assurance, and safety monitoring and inspection duties.

(11) Accept COR authority for awarded task orders.

(12) Oversee the construction of the awarded task orders.

(13) Enforce occupation safety and health standards, labor standards, and other applicable standards.

(14) Ensure compliance with quality assurance and safety requirements and provide quality assurance reports as required by Appendix A.

(15) Receive contractor invoices, verify savings and recommend payments be made to the contractor.

(16) Perform management of contracting issues related to task order administration for follow-on years.

V. FUNDING, MANPOWER, SCHEDULE, AND REPORTING

A. Funding:

DOD provided funding to USAESCH to "jump-start" the ESPC efforts for DOD agencies. USAESCH will distribute funds to KCDE for their efforts. Fort Wood will be responsible for funding their responsibilities. Should sustainment funding from DOD not be made available beyond its inital introductory period, Fort Wood will be required to fund the Corps' reimbursable costs. If Fort Wood does not fund these activities, all work stops on the delivery orders being processed.

B. Manpower:

No additional manpower spaces will be required from the other party. Each party will execute its responsibilities within the existing manpower authorization or will request additional manpower authorization through its normal allocation process.

C. Schedule:

USAESCH will develop and maintain the execution schedule for each project through task order award.

D. Reporting:

KCDE will report to USAESCH. The content of these reports will be determined by mutual agreement.

In accordance with Public Law 102-486, each agency involved in the ESPC program will report specific information to the Secretary, Department of Energy at least annually. To ensure reporting requirements are satisfied, Fort Wood will provide status reports annually for the previous fiscal year for consolidation and submittal by its Headquarters. The content of these reports will be determined by mutual agreement.

VI. EFFECTIVE DATE, AMENDMENT, AND TERMINATION

A. This MOA becomes effective on the date of the latest signature.

B. The parties to this MOA will meet at the request of any party to review the provisions of this agreement. Any necessary additions, deletions, or changes shall be made in writing and signed by the signatories or their designated representatives.

C. This MOA will remain in effect until superseded or terminated by written mutual agreement. The provisions of this MOA will be reviewed by USAESCH, KCDE, and Fort Wood on two-year intervals. The review will occur within 60 days prior to each two-year anniversary. Either party wishing to terminate this MOA shall submit a written notification with sufficient notice to prevent unreasonable disruption to projects.

U.S. Army Engineering
Support Center, Huntsville

WALTER J. CUNNINGHAM (date)
Colonel, EN
Commanding

Kansas City District Engineers

GEORGE H. HAZEL (date)
Colonel, EN
Commanding

Fort Leonard Wood

3 AUG 98
ROBERT B. FLOWERS (date)
Major General, USA
Commanding

APPENDIX A

QUALITY ASSURANCE AND SAFETY APPENDIX FOR
ENERGY SAVINGS PERFORMANCE CONTRACT

1.0 INTRODUCTION

1.1 Background. The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is the Army Technical Center of Expertise for Energy Savings Performance Contracting (ESPC). ESPC allows a contractor to provide goods and services necessary to reduce expenditures for energy at Government installations in return for a portion of the resultant savings. USAESCH has been active in Government ESPC since its inception in 1984.

1.2 Purpose. The purpose of this Quality Assurance and Safety Appendix is to lay out the roles, responsibilities, reporting procedures, and methodologies that will be employed by the ESPC participants to ensure compliance with all contract and task order requirements. It also provides a basis from which the achievement of quality for the program can be measured.

2.0 APPLICABILITY

2.1 This appendix applies to USAESCH, Fort Wood, and the ESPC contractor. It is based on the scenario where USAESCH retains Procurement Contracting Officer (PCO) authority for the contract. This appendix covers only those responsibilities pertaining to quality assurance and safety for the work performed under the contract. Roles and responsibilities related to other aspects of the contract are covered elsewhere in the Memorandum of Agreement.

3.0 QUALITY ASSURANCE REQUIREMENTS

3.1 Organizational Responsibilities

USAESCH Responsibilities:

a. Provide a single point of contact at USAESCH responsible for coordinating quality assurance for ESPC.

b. Receive, review, and maintain quality assurance reports provided by Fort Wood.

c. Coordinate with Fort Wood and resolve any quality assurance issues that may arise.

Fort Wood Responsibilities:

a. Provide a quality assurance plan that shows how Fort Wood will ensure the quality of the work performed by the contractor.

b. Provide qualified inspectors (in accordance with section 4.0) at the site responsible for ensuring quality assurance. The quality assurance (QA) inspector needs to have some background and experience in the areas of work in which QA is being performed. Provide a single point of contact to USAESCH with overall responsibility for Government QA. Furnish USAESCH with written qualifications statements for all inspectors.

c. Provide a Contracting Officer's Representative (COR) in accordance with section 4.0.

d. Verify that the contractor provides goods and services in accordance with the basic contract and all task orders issued under the contract.

e. Provide monthly summaries of quality assurance reports generated by Fort Wood to USAESCH.

f. Notify USAESCH immediately of any quality assurance violations or any deviations from terms and/or conditions of the contract. Inspectors may only report deficiencies. They may not direct the contractor to correct or perform rework. Such direction is to be issued only by the Contracting Officer.

g. Fort Wood will inspect and monitor the contractor's compliance with the approved safety plan and 29 CFR 1910 (Occupational Safety and Health Agency, OSHA). The safety inspector will verify contractor compliance with Engineering Manual 385-1-1, Safety and Occupational Health Program Management. This includes the contractor's prompt filing of ENG Form 3394, Accident Investigation Report, in the event of an accident/work-related injury. The safety inspector is empowered to stop the contractor's work to prevent/correct a safety violation. All safety violations (or suspected violations) must be reported to the prime contractor's point of contact and the USAESCH project manager. If urgent, the USAESCH Safety Office point of contact is Mr. Bill Chaffin, 256-895-1583.

Contractor Responsibilities: (For Information Only)

a. Provide goods and services in accordance with task orders issued under the basic contract.

b. Perform quality control in accordance with the approved Quality Control Plan.

3.1.3.3. Work in accordance with OSHA.

4.0 QUALIFICATIONS OF KEY PERSONNEL

a. Contracting Officer Representative - Minimum of two years contracting experience and successful completion of COR school or equivalent.

b. Quality Inspector - Minimum of two years Government quality assurance/inspection experience.

Army 46 Stake

ORDER FOR SUPPLIES OR SERVICES

(Contractor must submit four copies of invoice.)

Form Approved
OMB No. 0704-0187
Expires Jun 30, 1997

PAGE 1 OF 2

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US ARMY ENGINEERING & SUPPORT CENTER
ATTN: CEHNC-CT-A/C. SARGENT
P.O. BOX 1600
HUNTSVILLE AL 35807-1957
Carol Sargent A02 (256) 895-1124

7. ADMINISTERED BY (If other than 6) CODE 8031

See Block 6

8. DELIVERY FOB
- [X] DEST
- [ ] OTHER (See Schedule if other)

9. CONTRACTOR Vendor Id: 00001386 CODE 0EBY9 FACILITY CODE

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SEMPRA ENERGY SERVICES
ATTN ERBIN KEITH
2500 CITY WEST BOULEVARD SUITE 1800
HOUSTON TX 77042

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- [ ] SMALL DISAD-VANTAGED
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12. DISCOUNT TERMS 0% 000 Days Net 030

13. MAIL INVOICES TO See Block 15

14. SHIP TO CODE EMPTY

FORT LEONARD WOOD MO DACA87?7D0066

15. PAYMENT WILL BE MADE BY CODE EMPTY

DFAS Lawton, Fort Sill OPLOC
ATTN: DFAS-LW-FPV
4700 Mow Way Rd/Dept 1791
Fort Sill OK 73503-1791

MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER

16. TYPE OF ORDER

DELIVERY	X	This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract. Furnish the following on terms specified herein.
PURCHASE		Reference your ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

Sempra Energy Services Co. (NAME OF CONTRACTOR) — B.N. Tripathi (SIGNATURE) — B.N. Tripathi, President (TYPED NAME AND TITLE) — 10/14/99 (DATE SIGNED (YYMMDD))

[X] If this box is marked, supplier must sign Acceptance and return the following number of copies: 1

17. ACCOUNTING AND APPROPRIATION DATA / LOCAL USE

Award Oblig Amt US$ 0.00

XXX TOTAL PROJECT COST: $3,385,526.00

18. ITEM NO.	19. SCHEDULE OF SUPPLIES / SERVICE	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	All work to be performed in accordance with the attached Scope of Work, dated 24 September 1999 and the CES/Way Fort Leonard Wood proposal dated July 28, 1999, which is referenced but not incorporated into this task order award. *****Payment will be monthly for a total of 15 years. The total annual payment is $408,119.0, monthly payment				

*If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.

24. UNITED STATES OF AMERICA BY: Donna Bliss 315 — 10/15/99 — Donna L Bliss — CONTRACTING / ORDERING OFFICER

25. TOTAL $ 0.00

29. DIFFERENCES

30. INITIALS

26. QUANTITY IN COLUMN 20 HAS BEEN
- [ ] INSPECTED
- [ ] RECEIVED
- [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

DATE — SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

27. SHIP. NO.
- [ ] PARTIAL
- [ ] FINAL

28. D.O. VOUCHER NO.

32. PAID BY

33. AMOUNT VERIFIED CORRECT FOR

31. PAYMENT
- [ ] COMPLETE
- [ ] PARTIAL
- [ ] FINAL

34. CHECK NUMBER

35. BILL OF LADING NO.

36. I certify this account is correct and proper for payment.

DATE — SIGNATURE AND TITLE OF CERTIFYING OFFICER

37. RECEIVED AT	38. RECEIVED BY (Print)	39. DATE RECEIVED (YYMMMDD)	40. TOT. CONTAINERS	41. S/R ACCOUNT NUMBER	42. S/R VOUCHER NO.

DD Form 1155, JUN 94 — PREVIOUS EDITIONS MAY BE USED. — 480/122

SEMPRA ENERGY SERVICES

will be approximately $34,009.92. Payment will be in accordance with the terms and conditions of the basic contract, the attached Scope of Work, and the Fort Leonard Wood proposal Section 3, Financials and Appendix I.

The termination schedule is located in Appendix K of the referenced proposal.

Davis Bacon Wage Rates will be utilized for this Task Order.

Performance and Payment Bonds are required and Notice to Proceed with construction will not be issued until bonds are received by the contracting office.

Total Project Cost is $3,385.526.00.

NOTE: This task order is issued pursuant to the authority granted to the Government by the Energy Policy Act of 1992 (P.L. 102-486), Executive Order 13123 and 10 USC 2865, for the purpose of reducing energy consumption and energy costs. Notwithstanding any provision of Contract No. DACA87-97-D-0066 including the following contract clauses: Availability of Funds clause (52.232-19), Cancellation Under Multi-Year Contracts clause (52.217-2), and Termination for Convenience clause (52.249-2) thereof, the Government represents that is has multi-year authority with respect to this task order, and that prior to any termination for any reason under this contract, the Government will have funds available to pay all termination costs as defined by the termination schedule (Appendix K). The Government recognizes that it will incur a gradually declining liability. In the event of any early termination, the Government obligation for payment shall be determined using the termination schedule defined above.

DACA87-97-D-0066
TASK ORDER 2

SCOPE OF WORK
REPLACEMENT OF AIR-COOLED CONDENSING UNITS AND INSTALLATION OF WATER SAVINGS DEVICES IN THE FAMILY HOUSING AREA
FORT LEONARD WOOD, MO

1.0 GENERAL REQUIREMENTS

1.1 Sempra Energy Services shall perform Task Order #2 Replacement of air-cooled condensing units (ACCUs) and the installation of water saving devices in the family housing units in accordance with this scope of work and the back-up data supplied July 1999 as Transmittal 99-FLW-2.

1.1.1 Due to the anti-deficiency act, if it is determined as a later date that the amount of savings calculated in a proposal are incorrect, then the savings/payments must be modified to account for the disparity and to comply with the anti-deficiency act.

1.1.2 During the implementation of this task order, the Government reserves the right to examine the performance of the installed equipment. If the performance of the equipment is questionable due to factors within the contractor's control such as but not limited to the contractor's performance of maintenance, misrepresentation of equipment, or improperly installed equipment, the Government will require the contractor to measure the equipment performance. If the equipment is performing as indicated in the contractor's proposal, the task order will be modified to pay the contractor for the agreed upon fair and reasonable cost incurred for the testing. If the equipment is not performing as indicated in the contractor's proposal, the contractor shall perform the testing at no additional cost to the Government. If the equipment does not meet the required performance parameters, either the contractor shall modify the equipment to meet the performance parameters indicated in the proposal or there will be a modification to the contractor's payment to reflect the equipment's actual performance as mutually agreed upon by the Government and the contractor.

1.2 The objective of this Task Order is for Sempra Energy Services to provide all labor, materials, and equipment necessary to complete the following projects in accordance with all installation, State, and Federal codes and laws. To accomplish this objective Sempra Energy Services shall adhere to the following:

1.2.1 Sempra Energy Services shall coordinate all work schedules with Fort Leonard Wood at least one week in advance of performing any work. Sempra Energy Services shall receive acceptance of the work schedule from Fort Leonard Wood prior to beginning construction.

1.2.2 Sempra Energy Services shall reuse components which are verified as in good condition and dispose of other removed equipment, parts and debris, as instructed by installation personnel in accordance with installation, local, State, and Federal regulations. This includes disposal of equipment containing PCB material and or other hazardous material that must be disposed in a licensed hazardous waste facility approved for hazardous material storage.

1.2.3 Sempra Energy Services shall restore each work site to its original configuration including replacement of or repair of items damaged, modified or removed, during the project outside the scope of this Task Order, at Sempra Energy Services's expense.

1.2.4 Sempra Energy Services shall allow Fort Leonard Wood to retain any reusable equipment/items that are removed and not needed to implement this task order.

1.2.5 Sempra Energy Services shall coordinate all construction activities with the facility in advance prior to formalizing them in a schedule to assure continuous uninterrupted operation of the building.

1.2.6 Sempra Energy Services shall attend weekly or biweekly construction meetings as mutually agreed between Sempra Energy Services and the facility personnel. The attendees for the meetings should include the facility personnel, quality control personnel, and subcontractor personnel. Sempra Energy Services shall provide minutes of the meetings to all attendees. Sempra Energy Services shall also maintain project status of the Task Order with the facility by identifying percentage of project completion.

1.2.7 Sempra Energy Services shall identify all existing asbestos material for this Task Order, which would be disturbed as a result of this Task Order. Sempra Energy Services shall certify that all asbestos has been removed in accordance with an approved asbestos plan prior to the beginning of any work on this Task Order.

1.2.8 Sempra Energy Services shall identify all contractor operation & storage areas that will be utilized during construction. Sempra Energy Services

shall identify the contractors' field offices location including sanitation and utilities.

1.2.9 Sempra Energy Services shall be responsible for identifying and obtaining all necessary facility, state, and federal permits that will be required before performing any work on this Task Order.

1.2.10 Sempra Energy Services shall ensure products provided under this contract, to include hardware, software, firmware, and middleware, whether acting along or combined as a system, are Year 2000 compliant as defined in FAR Part 39.

1.2.11 Sempra Energy Services shall be responsible for the all risks within their control associated with savings performance of all projects. The Government shall be responsible for the savings risks associated with the unit cost of energy and the hours of operation and usage of the facility. If at any time during the term of the contract, the projects do not create sufficient savings on an annual basis to fund the contractors payment for reasons within the Government's control or if energy unit prices change, then the Government is obligated to pay the contractor as agreed or renegotiate the payment and term in a form mutually agreeable to both parties. If at any time during the term of the task order, projects do not create sufficient savings on an annual basis to fund the herein indicated contractor payment for reasons within the contractors control, then the payment due the contractor will be limited to the actual savings generated by the project as determined utilizing the unit costs of energy and the hours of operation indicated in of the contractors proposal. Sempra Energy Services shall be responsible for but not limited to the assumptions and projections of savings, proper design, proper construction, and proper maintenance and repair of systems for which they have maintenance and repair responsibility.

2.0 SPECIFIC REQUIREMENTS

2.1 Replacement of Air-Cooled Condensing Units (ACCUs) and Installation of Water Saving Devices

2.1.1 Sempra Energy Services shall replace the air-cooled condensing units (ACCUs) and install the water saving devices in the family housing area in accordance with Task Order #2 Replacement of air-cooled condensing units (ACCUs) and Installation of water saving devices in the family housing area for Fort Leonard Wood and this scope of work.

2.1.2 The installation costs associated with the air-cooled condensing units (ACCUs) and the water saving devices for the family housing area included in Task Order #2 are listed in section 3 Total Project Costs of this scope of work. For more detail refer to the backup data.

2.1.3 Sempra Energy Services will develop a baseline and post installation energy usage for the air-cooled condensing units (ACCUs) and the water saving devices in the family housing area based upon section 2.3 of the backup data Transmittal Number 99-FLW-2.

2.1.4 Sempra Energy Services shall develop and maintain a detailed accurate inventory data list for all new equipment installed at Fort Leonard Wood. This detailed inventory list shall be submitted by Sempra Energy Services to the Government. This information will be incorporated into the final reconciliation report prepared per Data Item Description (DID) BW023, Site Specific ECSM Report.

2.1.5 The payment due to Sempra Energy Services will be limited to the actual savings generated. These savings will be determined by the energy cost savings determination methods as described in section 2.3.4 of the backup data Transmittal Number 99-FLW-2.

2.1.6 Sempra Energy Services will not perform maintenance and repair for all installed equipment under this Task Order. Fort Leonard Wood's current maintenance subcontractor will perform maintenance and repair for the installed new equipment. If Fort Leonard Wood's subcontractor can not perform the maintenance, Sempra Energy Services will assume maintenance responsibilities at an additional negotiated cost. Sempra Energy Services shall inspect the equipment regularly and notify Fort Leonard Wood in writing of any maintenance deficiencies.

2.1.7 Equipment ownership responsibility and title will be transferred to the Government at time of project acceptance in accordance with the final reconciliation report prepared per Data Item Description (DID) BW023, Site Specific ECSM Report.

3.0 TOTAL PROJECT COST

The installation costs associated with the air-cooled condensing units (ACCUs) and the water saving devices for the family housing area included in Task Order #2 are below. For more detail refer to the backup data.

ECM Direct Cost: $3,116,460
Contractor Design Costs: $57,633

Measurement/Verification Cost: $92,316
Total Construction Cost: $3,266,409
Construction Interest: $69,420
Total Amount Financed: $3,385,526
Annual Energy Savings: $293,023
Annual Ancillary Savings: $116,622
Total Annual Savings: $409,645
Sempra Energy Services % Share of Savings: 99%
Fort Leonard Wood % Share of Savings: 1%
Interest Rate %: 8.158%
Task Order Financing Term: 15 years

4.0 DELIVERABLES

4.1 Sempra Energy Services shall provide, maintain, and execute an approved site safety and health plan in accordance with DID BW010.

4.2 Sempra Energy Services shall provide, maintain, and execute an approved quality control plan in accordance with DID BW009.

4.3 Sempra Energy Services shall provide a work schedule in accordance with DID BW011, Work schedule.

4.4 Sempra Energy Services shall prepare final as-built drawings in accordance with DID BW022, AS-Build Drawings, and submit drawings to the Government.

4.5 Sempra Energy Services shall submit a final site-specific ECSM report in accordance with DID BW023, Site Specific ECSM Report, after completion of the ECSM.

4.6 Sempra Energy Services shall submit shop drawings in accordance with DID BW008 for any changes in material from that previously submitted.

DEPARTMENT OF THE ARMY
HEADQUARTERS
U.S. ARMY ENGINEER CENTER AND FORT LEONARD WOOD
FORT LEONARD WOOD, MISSOURI 65473-5000

REPLY TO
ATTENTION OF

MEMORANDUM OF AGREEMENT
BETWEEN
U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE (USAESCH), KANSAS CITY DISTRICT, CORPS OF ENGINEERS (KCDE), AND THE FORT LEONARD WOOD ARMY INSTALLATION

SUBJECT: Energy Savings Performance Contracting At Fort Leonard Wood, Missouri

I. PURPOSE

The purpose of this Memorandum of Agreement (MOA) is to establish the organizational relationships, responsibilities and procedures of the U.S. Army Engineering and Support Center, Huntsville, (USAESCH) between Kansas City District Corps of Engineers (KCDE) and Fort Leonard Wood (hereafter referred to as Fort Wood) for managing and executing an Energy Savings Performance Contracting (ESPC) program at the Fort Leonard Wood installation. The areas of responsibility and relationships presented herein will provide an effective management approach to support the accomplishment of energy conservation projects.

II. BACKGROUND

On 7 April 1986, Congress enacted legislation that permits Federal agencies to enter into energy conservation contracts. Shared Energy Savings (SES) projects were authorized by TitleVIII, Section 7201, Public Law 99-272 (42 U.S.C. 8287) as amended by Public Law102-486. On 24 October 1992, the concepts and terminology of Energy Savings Performance Contracting (ESPC) replaced SES with the passage of Public Law102-486.

An ESPC program is one where the contractor typically provides for the financing, design, construction, and maintenance for energy saving devices and systems. The contractor receives compensation out of the resulting energy cost savings and ancillary cost reductions.

In order to reduce the time and costs associated with preparing separate contracts for each energy conservation project, USAESCH developed and awarded several Indefinite Delivery/Indefinite Quantity contracts. DOD then provided funding to USAESCH to "jump-start" the ESPC program for DOD agencies. Fort Wood elected to utilize a portion of this funding to initiate the ESPC program at its location. Should sustainment funding from DOD not be made available beyond its inital introductory period, Fort Wood will be required to fund the Corps' reimbursable costs.

III. ESPC PROGRAM

The program provides a method to obtain task orders under a contract for investigation, development, and submittal of measures which will save the Government energy and money. The contractor shall provide the expertise, equipment, and services necessary to identify, investigate, document, design, finance, install, operate (if appropriate), and maintain Government approved Energy Cost Saving Measures (ECSM). In most cases where real property is required to produce savings, the Government will ultimately retain ownership of the property at the end of the ECSM task order period at no additional cost.

Real property is defined as the land and structures owned by the Government. Equipment and furnishings required to make a real property facility usable and are attached as permanent parts of the structure are known as installed building equipment. Installed building equipment is considered to be real property until severed.

Program Description.

USAESCH has advertised and procured multiple ESPC contracts. The program will be a joint effort between USAESCH, the ESPC contractor, KCDE, and Fort Wood. Thus far, a customer needs survey has been completed by Fort Wood and returned to USAESCH. A short list of potential contractors will be made available by USAESCH based on the survey results. This list will be forwarded to Fort Wood for final selection/approval of a contractor. USAESCH will formally notify the contractor of their selection.

KCDE coordinates with Fort Wood and performs the lead role in development of ECSMs proposed by the contractor. The contractor will coordinate all site surveys with the appropriate Fort Wood personnel. Fort Wood will be responsible for directing/coordinating the contractor's ECSM survey activities. The contractor submits a written proposal to USAESCH, KCDE, and Fort Wood. USAESCH performs a general review of the proposal and a detailed review of the economic analysis/viability and the measurement and verification process. KCDE reviews the written proposal for cost and constructability. Fort Wood will review the complete proposal for acceptability to meet installation requirements. If negotiations are necessary, USAESCH will perform the lead role and KCDE and Fort Wood will be involved, if they request. Fort Wood will have approval authority for each task order and may stop the ECSM from further development at any time before award of a task order. No penalty will incur from terminating an ECSM proposal before award. The costs accrued by the contractor up to the point of termination may be recouped if justified. USAESCH will award the task order. USAESCH will appoint a Contracting Officer's Representative at KCDE and at Fort Wood.

There are two methods available to the contractor for developing ECSM proposals. The first method is the preferred or standard process. The contractor elects to accept all the risks of a streamlined approach and proceeds with performing the steps necessary to complete a proposal before submitting it to the Government for review. The second method is an expanded process where Government review and approval of each separate phase is performed before the contractor proceeds to the follow-on phase. In general, the various phases are site survey report, feasibility study, engineering design (may require multiple reviews), and proposal. The expanded method is used for large and/or complex ECSMs where costs and risks are significant. All Government reviews will be performed simultaneously by KCDE, Fort Wood and USAESCH personnel. Prior to negotiations with the contractor, KCDE will prepare a Government estimate regardless of which method is being used. After approval by Fort Wood, USAESCH will award the task orders.

IV. RESPONSIBILITIES

A. The U.S. Army Engineering and Support Center, Huntsville (USAESCH) will:

(1) Serve as focal point for managing, developing, and coordinating all aspects of the ESPC program.

(2) Coordinate with Fort Wood and KCDE to select a contractor. USAESCH will formally notify the successful contractor of the selection.

(3) Provide ESPC training to Fort Wood personnel.

(4) Appoint (including approve) individuals at KCDE selected for Contracting Officer's Representative (COR) for reviews of contractor submittals.

(5) Evaluate feasibility studies and provide a recommendation to Fort Wood. (In the casae of the expanded method, USAESCH will evaluate all contractor submittals for each phase and provide recommendations to Fort Wood.

(6) Evaluate the contractor's proposals for economic viability, acceptability of measurements, and verification plan. Provide review comments to KCDE.

(7) Lead negotiations.

(8) Award task orders for ECSMs

(9) Coordinate Congressional notification for a project or group of projects which have an accumulated value of over $750,000.

(10) Provide Quality Assurance support, as described in Appendix A.

(11) Appoint (including approve) individuals at Fort Wood selected for Contracting Officer's Representative (COR), quality assurance, and safety monitoring and inspection duties.

(12) Delegate COR authority to Fort Wood on awarded task orders.

(13) Coordinate all reviews and ESPC actions described above with KCDE and Fort Wood.

B. KCDE will:

(1) Coordinate the MOA with USAESCH and Fort Wood.

(2) Provide a customer survey to Fort Wood.

(3) Provide qualifications for personnel recommended for COR duties associated with reveiw of contractor submittals.

(4) Participate in contractor selection.

(5) Evaluate site survey reports and provide recommendations to Fort Wood.

(6) Coordinate the review of all contractor submittals with USAESCH and Fort Wood. Collect and coordinate all review comments and forward to the contractor via cover letter signed by the COR.

(7) Evaluate designs.

(8) Coordinate the development of the written ECSM proposal among the contractor, Fort Wood and USAESCH.

(9) Review the written proposal for cost and constructability.

(10) Determine if contractor's costs are fair and reasonable. Prepare price negotiation objectives, if necessary.

(11) Participate in negotiations, as required.

(12) Provide environmental support, if requested by Fort Wood.

C. Fort Wood will:

(1) Have responsibility for providing appropriate environmentally-acceptable sites and process site environmental survey and clearance documentation.

(2) Participate in ESPC training provided by USAESCH.

(3) Obtain project approvals.

(4) Have responsibility for providing documentation required by the National Environmental Policy Act, and any other applicable federal, state, or local environmental laws and regulations.

(5) Have responsibility for handling real estate matters, including access permits, rights-of-way and easements.

(6) Coordinate contractor site visits to potential project locations.

(7) Participate in the task order execution. Fort Wood will:

(a) Make decisions regarding site surveys, feasibility studies and designs.

(b) Assist in evaluating the contractor's submittals/proposals. Provide review comments to KCDE.

(8) Approve the task order terms prior to award.

(9) Submit project status information (to include energy savings data) as part of their submission for annual energy reports to higher authorities.

(10) Provide qualifications or personnel recommended for COR, quality assurance, and safety monitoring and inspection duties.

(11) Accept COR authority for awarded task orders.

(12) Oversee the construction of the awarded task orders.

(13) Enforce occupation safety and health standards, labor standards, and other applicable standards.

(14) Ensure compliance with quality assurance and safety requirements and provide quality assurance reports as required by Appendix A.

(15) Receive contractor invoices, verify savings and recommend payments be made to the contractor.

(16) Perform management of contracting issues related to task order administration for follow-on years.

V. FUNDING, MANPOWER, SCHEDULE, AND REPORTING

A. Funding:

DOD provided funding to USAESCH to "jump-start" the ESPC efforts for DOD agencies. USAESCH will distribute funds to KCDE for their efforts. Fort Wood will be responsible for funding their responsibilities. Should sustainment funding from DOD not be made available beyond its inital introductory period, Fort Wood will be required to fund the Corps' reimbursable costs. If Fort Wood does not fund these activities, all work stops on the delivery orders being processed.

B. Manpower:

No additional manpower spaces will be required from the other party. Each party will execute its responsibilities within the existing manpower authorization or will request additional manpower authorization through its normal allocation process.

C. Schedule:

USAESCH will develop and maintain the execution schedule for each project through task order award.

D. Reporting:

KCDE will report to USAESCH. The content of these reports will be determined by mutual agreement.

In accordance with Public Law 102-486, each agency involved in the ESPC program will report specific information to the Secretary, Department of Energy at least annually. To ensure reporting requirements are satisfied, Fort Wood will provide status reports annually for the previous fiscal year for consolidation and submittal by its Headquarters. The content of these reports will be determined by mutual agreement.

VI. EFFECTIVE DATE, AMENDMENT, AND TERMINATION

A. This MOA becomes effective on the date of the latest signature.

B. The parties to this MOA will meet at the request of any party to review the provisions of this agreement. Any necessary additions, deletions, or changes shall be made in writing and signed by the signatories or their designated representatives.

C. This MOA will remain in effect until superseded or terminated by written mutual agreement. The provisions of this MOA will be reviewed by USAESCH, KCDE, and Fort Wood on two-year intervals. The review will occur within 60 days prior to each two-year anniversary. Either party wishing to terminate this MOA shall submit a written notification with sufficient notice to prevent unreasonable disruption to projects.

U.S. Army Engineering
Support Center, Huntsville

WALTER J. CUNNINGHAM (date)
Colonel, EN
Commanding

Kansas City District Engineers

GEORGE H. HAZEL (date)
Colonel, EN
Commanding

Fort Leonard Wood

3 AUG 98

ROBERT B. FLOWERS (date)
Major General, USA
Commanding

APPENDIX A

QUALITY ASSURANCE AND SAFETY APPENDIX FOR
ENERGY SAVINGS PERFORMANCE CONTRACT

1.0 INTRODUCTION

1.1 Background. The U.S. Army Engineering and Support Center, Huntsville (USAESCH) is the Army Technical Center of Expertise for Energy Savings Performance Contracting (ESPC). ESPC allows a contractor to provide goods and services necessary to reduce expenditures for energy at Government installations in return for a portion of the resultant savings. USAESCH has been active in Government ESPC since its inception in 1984.

1.2 Purpose. The purpose of this Quality Assurance and Safety Appendix is to lay out the roles, responsibilities, reporting procedures, and methodologies that will be employed by the ESPC participants to ensure compliance with all contract and task order requirements. It also provides a basis from which the achievement of quality for the program can be measured.

2.0 APPLICABILITY

2.1 This appendix applies to USAESCH, Fort Wood, and the ESPC contractor. It is based on the scenario where USAESCH retains Procurement Contracting Officer (PCO) authority for the contract. This appendix covers only those responsibilities pertaining to quality assurance and safety for the work performed under the contract. Roles and responsibilities related to other aspects of the contract are covered elsewhere in the Memorandum of Agreement.

3.0 QUALITY ASSURANCE REQUIREMENTS

3.1 Organizational Responsibilities

USAESCH Responsibilities:

a. Provide a single point of contact at USAESCH responsible for coordinating quality assurance for ESPC.

b. Receive, review, and maintain quality assurance reports provided by Fort Wood.

c. Coordinate with Fort Wood and resolve any quality assurance issues that may arise.

Fort Wood Responsibilities:

a. Provide a quality assurance plan that shows how Fort Wood will ensure the quality of the work performed by the contractor.

b. Provide qualified inspectors (in accordance with section 4.0) at the site responsible for ensuring quality assurance. The quality assurance (QA) inspector needs to have some background and experience in the areas of work in which QA is being performed. Provide a single point of contact to USAESCH with overall responsibility for Government QA. Furnish USAESCH with written qualifications statements for all inspectors.

c. Provide a Contracting Officer's Representative (COR) in accordance with section 4.0.

d. Verify that the contractor provides goods and services in accordance with the basic contract and all task orders issued under the contract.

e. Provide monthly summaries of quality assurance reports generated by Fort Wood to USAESCH.

f. Notify USAESCH immediately of any quality assurance violations or any deviations from terms and/or conditions of the contract. Inspectors may only report deficiencies. They may not direct the contractor to correct or perform rework. Such direction is to be issued only by the Contracting Officer.

g. Fort Wood will inspect and monitor the contractor's compliance with the approved safety plan and 29 CFR 1910 (Occupational Safety and Health Agency, OSHA). The safety inspector will verify contractor compliance with Engineering Manual 385-1-1, Safety and Occupational Health Program Management. This includes the contractor's prompt filing of ENG Form 3394, Accident Investigation Report, in the event of an accident/work-related injury. The safety inspector is empowered to stop the contractor's work to prevent/correct a safety violation. All safety violations (or suspected violations) must be reported to the prime contractor's point of contact and the USAESCH project manager. If urgent, the USAESCH Safety Office point of contact is Mr. Bill Chaffin, 256-895-1583.

Contractor Responsibilities: (For Information Only)

a. Provide goods and services in accordance with task orders issued under the basic contract.

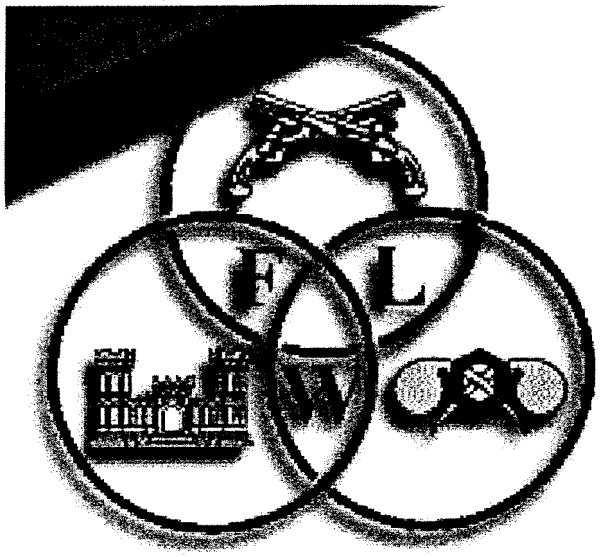
b. Perform quality control in accordance with the approved Quality Control Plan.

3.1.3.3. Work in accordance with OSHA.

4.0 QUALIFICATIONS OF KEY PERSONNEL

a. Contracting Officer Representative - Minimum of two years contracting experience and successful completion of COR school or equivalent.

b. Quality Inspector - Minimum of two years Government quality assurance/inspection experience.



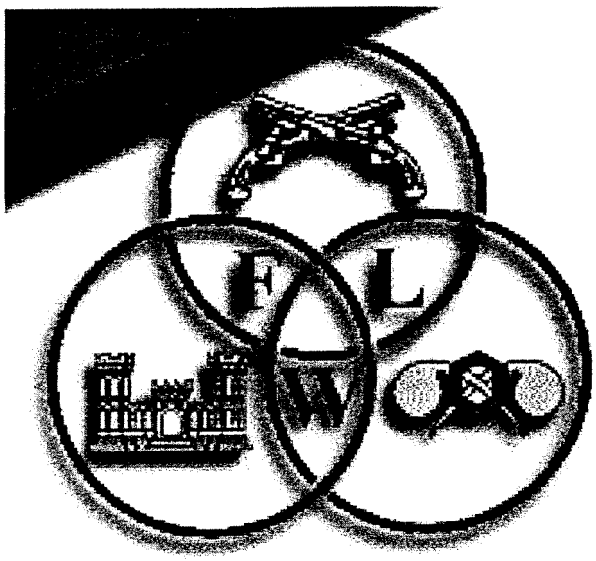
FORT LEONARD WOOD

Submitted to:
Directorate of Public Works
Attn: Allen W. Simpson
1334 First Street (Bldg. 2101)
Fort Leonard Wood, MO 65473-8944

Submitted by:
CES/Way International, Inc.
2500 CityWest Blvd., Suite 1800
Houston, Texas 77042
Tel: 713-361-7600

July 28, 1999

CES|Way
A Sempra Energy Solutions Company



FORT LEONARD WOOD

Submitted to:
Directorate of Public Works
Attn: Allen W. Simpson
1334 First Street (Bldg. 2101)
Fort Leonard Wood, MO 65473-8944

Submitted by:
CES/Way International, Inc.
2500 CityWest Blvd., Suite 1800
Houston, Texas 77042
Tel: 713-361-7600

CES|Way
A Sempra Energy Solutions Company

July 28, 1999

July 28, 1999

Mr. Allen W. Simpson
Directorate of Public Works
1334 First Street (Bldg. 2101)
Ft. Leonard Wood, MO 65473-8944

Subject: Revised cover letter for Ft. Leonard Wood

Dear Mr. Simpson:

CES/Way International is pleased to present our proposal for Task Order Two of our Energy Savings Performance Contract (ESPC) for Ft. Leonard Wood. We are presenting this as a ***Lump Sum Fixed Price*** contract. The final quanties of each item installed under this Task Order, will be verified after the job is completed and the appropriate adjustments and reconciliations will be made to the cost and savings numbers in the contract.

Enclosed please find our proposal for Task Order Two dealing exclusively with family housing. Task Order Two consist of two components, replacement of residential air-conditioning systems and water conservation. Task Order Two has a cost of $3,267,235 and generates $409,317 in annual savings. Future Task Orders will address the specific needs of the base.

Residential air-conditioning equipment has an expected life according to ASHRAE, the American Society of Heating Refrigeration Air-Conditioning Engineers, of fifteen years. We plan to replace the air-conditioning systems in all of the residences that have not previously been updated; our current count is 2,221 systems. The system consists of an air-cooled condenser and an evaporator coil for each residence. The water conservation consists of the replacement of 3,194 showerheads, and 6,895 aerators in family housing.

Thank you for this opportunity. We look forward to meeting with you to answer any questions or concerns. If any questions come up that you need immediate answers to please contact me directly at **708-923-0278**.

Best regards

William F. Cook
CES/Way International

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SUBMITTAL FORM 4025

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE *(Read instructions on the reverse side prior to initialing this form)*	DATE	TRANSMITTAL
	July 28, 1999	99-FLW-2

SECTION I – REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS *(This section will be initiated by the contractor)*

TO:	FROM:	CONTRACT NO.	CHECK ONE:
Cdr, US Army Engr & Spt Ctr, Huntsville Attn: CEHNC-PM-CR (Alan Simpson) PO Box 1600 Huntsville, Alabama 35807-4301	Sempra Energy Services 2500 City West Blvd., Suite 1800 Houston, TX 77042	DACA87-97-D-0066	☐ THIS IS A NEW TRANSMITTAL ☒ THIS IS A RESUBMITTAL OF TRANSMITTAL 99- FLW- 1

SPECIFICATION SEC. NO. *(Cover only one section with each transmittal)*	PROJECT TITLE AND LOCATION	CHECK ONE: THIS TRANSMITTAL IS
Data Item BW006	Fort Leonard Wood	FOR ☐ FIO ☒ GOV'T. APPROVAL

ITEM NO.	DESCRIPTION OF ITEM SUBMITTED *(Type size, model number/etc.)*	MFG OR CONTR. CAT., CURVE DRAWING OR BROCHURE NO. *(See Instruction No. 8)* c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT		FOR CONTRACTOR USE CODE g.	VARIATION (See Instruction No. 6) h.	FOR CE USE CODE i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			
1	ECSM Proposal – With Modifications	N/A	3					
2	Comments and Responses	N/A	3					
3	Site Safety and Health Plan	N/A	3	N/A	N/A			
4	Quality Control Program	N/A	3	N/A	N/A			
5	Project Job Hazard Analysis	N/A	3	N/A	N/A			
6	Construction Bond	N/A	3	N/A	N/A			

REMARKS:

I certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated

Ajaz M. Lateef, Senior Vice President

NAME AND SIGNATURE OF CONTRACTOR

SECTION II – APPROVAL ACTION

ENCLOSURES RETURNED (List by item No.)	NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY	DATE

1 EXECUTIVE SUMMARY

1.1 Statement of Work

The following work will be performed in the Family Housing area of Fort Leonard Wood Army Base:

- Replacement of air-cooled condensing units (ACCUs) and evaporator coils with new more efficient ACCUs and evaporator coils.
- Replacement of existing shower fixtures with water conserving shower fixtures and the installation of aerators on kitchen and lavatory faucets.

1.2 Overview and Recommended ECSMs

Due to the age of the equipment, the ACCUs in Family Housing at Fort Leonard Wood Army Base are in poor condition. Also, due to the alterations to some of the housing units, some ACCUs are undersized. These ACCUs require a considerable amount of maintenance and furthermore are operating inefficiently. These units are old and are past their life expectancy. Based on energy analysis performed by CES/Way, it is found to be economically feasible to replace the old ACCUs with new more efficient ACCUs.

The existing shower and sink fixtures use an excessive amount of water. Retrofitting the shower fixtures with water conserving fixtures and installing aerators in the kitchen and bathroom sinks will reduce water consumption and wastewater production. The retrofit will also result in energy savings in the form of reduced hot water consumption.

1.3 Cost and Savings Summaries

The total ECM cost for the project is $3,266,409, with an annual energy saving of $293,023. The total ECM cost is comprised of two components, a direct ECM cost of $2,163,649 and a prorated project cost of $1,102,761. A further breakdown of the direct ECM cost includes a design cost of $57,633, a construction cost of $2,014,265, and measurement equipment and installation cost of $91,751.

1.4 O&M Summary

The total annual operations and maintenance savings for the project are $116,295.

1.5 M&V Cost Summary

There is an estimate of $91,751 for measurement equipment and labor associated with M&V costs, and $16,158 annually for Measurement Verification and Monitoring.

1.6 Implementation Schedule

Assuming timely approvals, procurement of the project will begin on August 02, 1999, following which removal of the existing equipment and the installation of the new equipment will occur. All of the equipment replacements are expected to be complete before the start of next summer. For a detailed project schedule refer to Appendix A.

2 ECSM PROJECTS

2.1 Description

2.1.1 Contact Person

CES/Way International held an initial meeting with Fort Leonard Wood and the Kansas City District Corps of Engineers (KCDE) on November 9, 1998. CES/Way was represented at this meeting by B.N. Tripathi, Ajaz Lateef, Mike Hill, and John Adams. During this meeting, CES/Way made its proposal for a site survey to Mr. Allen Simpson. On November 18, 1998, CES/Way's Mike Hill and Chad Corbitt returned to Fort Leonard Wood to conduct the survey. Due to the large size of the post, Chad Corbitt and Kevin Liu returned on December 1, 1998 to gather additional information. During the site survey process, Allen Simpson was the primary point of contact on post. A Site Survey Report (SSR) was prepared and sent to Allen Simpson at Fort Leonard Wood for comment on December 22, 1998.

CES/Way's Chad Corbitt and John Shockley started on-site work for the Feasibility Study on February 16, 1999 and returned again on March 2, 1999 to gather additional information. Water survey information was gathered by a CES/Way subcontractor who was on site May 12, 1999. During the Feasibility Study phase Allen Simpson remained the point of contact.

2.1.2 General Description

Fort Leonard Wood is a 63,000-acre military installation located in south central Missouri. The installation has over 12 million square feet of conditioned space. Approximately three million square feet are located in three Family Housing areas. The buildings in Family Housing consist of 22 different styles ranging from single family dwellings to eight-plex housing. Originally there were 2,862 individual units in Family Housing. However, due to past, present and future demolition, conversion to barracks, and use by private organizations the quantity remaining under Family Housing's jurisdiction is now 2,470.

2.2 Background Information

2.2.1 People Visited and Information Obtained

For both the site survey and the subsequent Feasibility Study, Allen Simpson was the primary contact. Additional people involved included Lieutenant Colonel Hal Alguire, Larry Myers, Scott Williamson, Earl Bivens, Horace Ingle, Keneth Davenport, Ron Pemberton, Keith Oligschlaeger, Wayne Daniels, Sandra Anderson and Rolla McCoy. Information obtained from Fort Leonard Wood personnel and subcontractors includes utility billing for AFH, an ACCU inventory list, an ACCU replacement list, house square footage, air conditioning maintenance records and plumbing fixture quantities.

2.2.2 Availability of Drawings and Maintenance Records

Air conditioning maintenance calls, the fall and spring maintenance requirements, the annual maintenance contract and a detailed list of the maintenance and repair items for July 1998 were obtained. For a sample of the maintenance information obtained see Appendix B.

2.2.3 Equipment Inspections and Measurements

The ACCUs at eight vacant residences were visually inspected, and model number and serial numbers were obtained when readable. In addition, instantaneous electrical measurements were taken on two of the condensing units; however, the data proved inconclusive since it was too cold for the units to be under a sufficient load. For a list of the residences inspected, the model and serial numbers obtained and the electrical measurements taken see Appendix C.

Water flow measurements were taken for selected fixtures at a sampling of the residences.

2.2.4 Determination of Problem Areas and Suggested Resolutions

Since the units are past their life expectancy, many of the ACCUs are in a deteriorated condition. The inefficiency of the units are causing several problems:

1. The units use an excessive amount of electrical energy for the cooling provided due to deterioration and inefficient operation,

2. on hot days the units cannot provide enough capacity to keep the home cool and comfortable,
3. some of the housing units have been altered and increased living area, the existing A/C units cannot provide enough capacity to keep these homes cool and comfortable, and
4. due to the age, the units are requiring more maintenance and repair simply to meet the cooling load that is being demanded of them.

As a solution to these problems CES/Way will replace all of the ACCUs and evaporator coils on homes having an ACCU that was manufactured during or prior to 1985. The new ACCUs and coils will reduce electrical energy consumption and maintenance requirements, while at the same time providing more occupant comfort.

The existing water fixtures are not modern low flow design fixtures. As a result, the fixtures use excessive amounts of both hot and cold water. CES/Way will replace the shower fixtures and install aerators on the faucets in order to reduce water consumption and reduce the energy needed to produce domestic hot water.

2.2.5 Hazardous Materials

All refrigerant will be removed from the units and recycled in accordance with State and Federal regulations. The removed equipment will be disposed of in an approved manner. CES/Way does not anticipate encountering any other hazardous materials during the installation of any of the ECSMs.

2.2.6 Available Data

The availability of pertinent data was excellent. As mentioned in section 2.2.1, utility bills, an inventory list, a list of replaced units and the square footage of each house was obtained. For a sample of the data obtained see Appendix D.

2.2.7 Assumptions

2.2.7.1 Current Operating Conditions

Currently the condensing units are not operating efficiently due to a reduction in heat transfer efficiency. Consequently the units are not able to meet the required cooling demand. Therefore, the units operate for extended periods of time.

Currently the water fixtures operate properly; however, the fixtures consume an excessive amount of water.

2.2.7.2 Projected Operating Conditions

The new condensing units will consume less energy due to improvements in unit efficiencies that have been made by ACCU manufacturers. Furthermore the units will have enough cooling capacity to meet the cooling demand. As a result, the units will not be required to operate for extended time periods to meet the load. Therefore, the units will use less energy and will be able to keep the occupants comfortable even in hot conditions.

Due to improvements in technology the new water fixtures will perform the same duties, but with a reduction in water consumption.

2.2.8 Documentation

Appendix B - Sample of maintenance information obtained
Appendix C - List of residents inspected
Appendix D - Sample of data obtained

2.3 ECSM proposal – ACCU and Evaporator Coil Replacement

2.3.1 Detailed Scope

Mechanical ECSM

According to the information that was available at the time of this report 2,221 existing ACCUs and evaporator coils will be removed and replaced with new ACCUs and evaporator coils.

Water Conservation ECSM

According to the information that was available at the time of this report 4,425 aerators will be installed on bathroom faucets, 3,194 shower heads will be replaced and 2,470 aerators will be installed on kitchen faucets.

2.3.2 Cost Estimate

The total ECM cost for the project is $3,266,409, with an annual energy saving of $293,023. The total ECM cost is comprised of two components, a direct ECM cost of $2,163,649 and a prorated project cost of $1,102,761. A further breakdown of the direct ECM cost includes a design cost of $57,633, a construction cost of $2,014,265, and measurement equipment and installation cost of $91,751.

2.3.3 Energy Cost Savings Estimate

2.3.3.1 Approach

Mechanical ECSM

A computer spreadsheet model based on information gathered during the various visits such as nameplate data, manufacturer data and unit capacity were used to determine savings.

Water Conservation ECSM

A computer spreadsheet model based on information gathered during the site visit such as water flow measurements, manufacturer data and family housing occupancy were used to determine savings.

2.3.3.2 Assumptions

Mechanical ECSM

The average annual cooling hours and efficiencies for this analysis were assumed to be 1050 hours and 7 EER for the pre 1981 units, 1000 hours and 8.25 EER for the pre 1986 units and 950 hours and 9.75 EER for the new units.

Water Conservation ECSM

At the time of the survey the occupancy in the family housing units was 78%, but Fort Leonard Wood recommended using 90% to reflect the increase in post population due to the BRAC additions, which are in progress. Each occupant is assumed to take one 8 minute shower per day and use the sink for an average of 4 minutes per day. The housing units - of the 90% occupied – are assumed to be occupied 351 days per year. The final savings calculations were reduced by 10% to account for the use of self purchased fixtures by some occupants.

2.3.3.3 Calculations

Mechanical ECSM

By replacing the ACCUs, energy is saved because of the increase in efficiency and the decrease in run hours. For the pre-installation case, total electrical use resulting from ACCU operation is:

Base case electric use (unit: kWh) = Σ no. of $hours_{existing}$ * cooling load (in Mbtuh) / $EER_{existing}$

For the post-installation case, total electricity use resulting from ACCU operation is:

After case electric use (unit: kWh) = Σ no. of $hours_{new}$ * cooling load in MBtuh / EER_{new}

For detailed calculations on electrical savings, refer to Appendix E.

Water Conservation ECSM

The annual water savings are calculated based on the difference in water flow rates between the existing fixtures and the new fixtures

multiplied by the number of occupants and the cumulative time of use. Energy usage for hot water is calculated by assuming that the temperature is raised 40 degrees F in the sinks and the showers and multiplying by the appropriate rate per kWh or therm.

For detailed calculations on water savings, refer to Appendix E.

2.3.3.4 Estimated Savings

Mechanical ECSM

The energy cost savings by implementing this energy conservation measure is $178,319 a year.

Water Conservation ECSM

The annual savings in water, wastewater and energy is $114,704.

2.3.4 Energy Cost Savings Determination Method

2.3.4.1 Approach

Mechanical ECSM

Short-term metering will be performed on randomly selected units as per the measurement and verification sampling plan detailed in Appendix F. This will be done before and after the retrofit. The measured data will be used to determine the efficiency of the units within each usage group presented in the sampling plan. Measured efficiencies will be multiplied by the unit's capacity to determine the instantaneous power draw for a particular unit. Run-time loggers will be installed on randomly selected new units for the purpose of calculating the consumption savings as well as for verifying unit performance in the out years.

Water Conservation ECSM

Savings resulting from the installed water conservation measures will be stipulated based on the agreed upon calculated savings.

2.3.4.2 Baseline Energy Measurement

Mechanical ECSM

Pre-installation efficiency measurement

Take the following measurements in 68 units:

Air volumetric flow rate	spot measurement
Return air drybulb temperature	short-term logging
Return air relative humidity	short-term logging
Supply air dry-bulb temperature	short-term logging
Condensing unit kW	short-term logging
Evaporator fan kW	spot measurement

Short-term logging shall be for a period of up to 28 days. The measured data will be used to map the kW draw of the unit with degradation using manufacturer's kW draw data. Mapped data from the sampled units will be applied to all units in a particular group. The resulting mapped data will be used together with long-term (average) weather data to determine a blended pre-installation kW draw per unit for each usage group.

Water Conservation ECSM

The baseline fixture consumption is stipulated based on the sample measurements obtained during the water survey and the stipulated consumption pattern of the occupants.

2.3.4.3 Post-retrofit Energy Usage

Mechanical ECSM

Installation of run-time meters during manufacturing stage of units on selected units

Run-time meters will be installed on 300 units during the manufacturing stage so that the units are supplied and installed with run-time meters.

One time post-installation efficiency measurement to verify manufacturer's kW draw per unit

More confidence is placed in manufacturer's data in post-installation case due to ability to install matched coils with new condensing units. Therefore, fewer spot measurements will be required to verify manufacturer's data. Measurements identical to those taken in pre-installation case will be used. The measurements will be taken on 27 units.

Determination of savings

Before and after kW draw curves will be used together with bin weather data to determine a blended before and after kW draw per unit while the unit is running. Run time loggers will be used to determine the run-times for selected units on an annual basis. The run-times for the selected units will be averaged for each usage group determined previously, removing any outliers in the data set. Outliers will be determined as units with run-times greater than or less than +/- 2 standards of deviation as calculated using the entire data set. The average runtime determined using the above method will be used for all units in a given usage group and multiplied by the difference between the before and after blended kW draw per unit to determine the kWh savings for the year. A diversity factor of 67.5%, as outlined in the savings spreadsheets in Appendix E, will be multiplied by the difference between the before and after peak kW draw per unit to determine the demand savings.

Baseline adjustments

Installation of new evaporator coils is expected to increase the instantaneous Btu/hr cooling capacity of a given unit. At the increased instantaneous capacity, the unit will be able to bring the space into the desired conditions in a shorter period of time. Assuming no change in the rate of heat gain to the space and assuming no change in thermostat operation, the ratio of run time in the after case to the run time in the before case can be approximated by the inverse ratio of instantaneous Btu/hr output before the retrofit to that after the retrofit while erring on the side of conservatism. Therefore, as a conservative approximation, the run times measured in the after case will be adjusted by

multiplying by the ratio of after-case Btu/hr cooling capacity to the before-case Btu/hr cooling capacity.

Long-term degradation determination

Run-time meters will help to determine the long-term degradation of units. CES/Way will perform an on-site inspection of the run-time meters and take readings following the closeout of the project. In the out years the post will gather the data from the run-time meters and CES/Way will analyze and provide a report on the gathered data. Units that show a significant increase in run-times during the out years as compared to the first 3 to 5 years will be measured for efficiency and capacity using the method described previously. If an efficiency degradation of greater than 10% is measured then an adjustment to the savings will be made prorated against the percentage of units showing similar increased run-hours. There-after an adjustment will be made for each incremental 10% degradation measured.

Water Conservation ECSM

The post-retrofit fixture consumption is stipulated based on the manufacturers specified flow rate and the stipulated baseline consumption pattern of the occupants.

2.3.4.4 Impact on Other Baselines

Other baselines will not be impacted by the implementation of Task Order One ECSMs.

2.3.5 Ancillary Cost Savings Estimate

2.3.5.1 Cost Element

Mechanical ECSM

Implementation of this project will save $116,295 in operations and maintenance annually.

Water Conservation ECSM

No ancillary savings were claimed as a result of the implementation of the water conservation measures.

2.3.5.1.1 Current Practices and Costs

Mechanical ECSM

Currently, D&D, the O&M subcontractor for family housing, replaces ACCUs, evaporator coils, and miscellaneous parts on an as needed basis. The needs for replacements and/or repairs are communicated to D&D when the occupant makes a call requesting service. During the service call to the residence D&D accesses the problem and makes the repairs necessary to correct the problem. The existing ACCUs and coils are old and they require a good deal of maintenance each year; with many units actually requiring complete replacement.

Water Conservation ECSM

Currently fixtures are only replaced due to failure.

2.3.5.1.2 Proposed Practices and Estimated Costs

Mechanical ECSM

The proposed O&M practices will use the same structure for determining problems and making repairs. However, since the units will be new the required number of service calls will be greatly reduced. Furthermore the units will be covered by the manufacturer's warranty for a portion of the contract. As a result, O&M costs will be greatly reduced.

Water Conservation ECSM

No changes in O&M practices are required for the water conservation ECSM.

2.3.5.1.3 Ancillary Savings Determination

Mechanical ECSM

The ancillary cost savings for this project were determined based on historical maintenance data and costs. The historical data was used to predict future trends.

Water Conservation ECSM

No ancillary cost savings were claimed for this ECSM.

2.3.5.2 Ancillary Cost Savings Estimate Summary

Mechanical ECSM

The ancillary savings for this ECSM will be $116,295 annually for the reduction in operations and maintenance expenses.

Water Conservation ECSM

No ancillary cost savings were claimed for this ECSM.

2.3.6 Ancillary Cost Savings Determination Method

2.3.6.1 Documentation

Appendix G – Ancillary Savings Calculations

2.3.7 LCC Analysis

LCC analysis was conducted using the BLCC program (version 4.61) developed by the National Institute of Standards and Technology (NIST). The comparative economic analysis generated by the program is provided in Appendix H.

2.3.8 Maintenance and Repair

2.3.8.1 Approach

Fort Leonard Wood's subcontractor that is responsible for the day to day maintenance in family housing will be responsible for the maintenance on the installed equipment.

2.3.8.2 Organization

To be determined by Fort Leonard Wood and their maintenance subcontractor who will be responsible for maintenance and repair.

2.3.8.3 Maintenance Plan

CES/Way recommends continuing the annual fall and spring maintenance on the equipment in accordance with existing maintenance practices. All maintenance will be the responsibility of Fort Leonard Wood and their subcontractor.

2.3.9 Operation

2.3.9.1 Approach

Fort Leonard Wood and its subcontractors will be responsible for the operations of the equipment installed.

2.3.9.2 Operations Plan

Fort Leonard Wood and its subcontractors will continue operations in accordance with the existing operations plan.

2.3.10. Implementation Schedule

Assuming timely approvals, procurement of the project will begin on August 02, 1999, following which removal of the existing equipment and the installation of the new equipment will occur. All of the equipment replacements are expected to be completed before the start of next summer. For a detailed project schedule refer to Appendix A.

2.3.11 Training

No training is required for these ECSMs.

2.3.12 Government Responsibility

As stated in sections 2.3.8.1 and 2.3.9.1, the government will be responsible for maintenance and repair, as well as operations of the equipment installed by CES/Way.

2.3.13 Interface with Existing ECSMs

There are no existing ECSMs.

2.3.14 Utility Coordination

No need for coordination with the local utility company is foreseen. If local outages are required, they will be coordinated with Fort Leonard Wood Directorate of Public Works (DPW).

2.3.15 Permits, Licenses, Approvals, Certifications

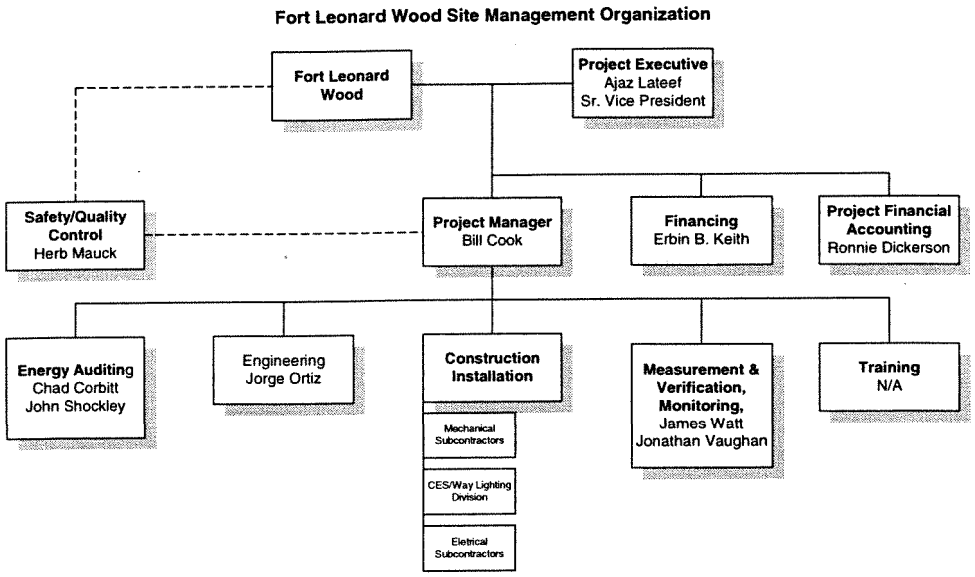
All contractors retained to perform work in the implementation of the recommended ECSM shall be licensed in their trades in the State of Missouri.

2.3.16 Environmental

R-22 refrigerant is used in ACCUs. The refrigerant in the ACCUs, which are to be removed and replaced, will be recycled in accordance with State and Federal regulations. No other environmental issues are foreseen at this time.

2.3.17 Management

2.3.17.1 Organization Chart



2.3.18 Documentation

Appendix E – Energy Savings Calculations
Appendix F – Measurement and Verification Sampling Plan
Appendix G – Ancillary Savings Calculations
Appendix H – Life Cycle Cost Analysis

2.4 Design

2.4.1 System Configuration

Mechanical ECSM

The new ACCUs will replace the old ACCUs once they are removed. The ACCU will tie into the existing refrigerant lines. The evaporator coils will also be removed and replaced. The electrical service that currently operates the existing ACCU will be used to operate the new ACCU.

As part of the replacement process some units and coils will be upsized if necessary. Upon completion all of the units will be sized based on the accepted engineering design standard of 500 sq.ft./ton, rounded to the nearest half ton. No units will be downsized.

The existing electrical service and refrigerant piping will be checked to ensure that these are adequate to handle the units which are upsized. If these warrant replacements, the same will be performed.

Water Conservation ECSM

The existing shower fixtures and faucet aerators will be removed and replaced with the new low flow devices.

2.4.2 Major Equipment

Major equipment to be installed includes ACCUs and evaporator coils. Equipment cut-sheets for basis of design are located in Appendix H.

2.4.3 Estimated Material Quantities

An estimated 2,221 ACCUs and evaporator coils will be replaced. It is also estimated that 4,425 aerators will be installed on bathroom faucets, 3,194 shower heads will be replaced and 2,470 aerators will be installed on kitchen faucets.

3 FINANCIALS

3.1 Financing Strategy

3.1.1 Energy and Maintenance Savings Sharing Arrangement

3.1.1.1 The Estimated Construction Cost for purposes of determining the Monthly Amortized Estimated Cost for implementation of Task Order ECMs shall be as follows:

3.1.1.2 COMPENSATION

For the Contractor's implementation of the Task Order ECMs as described herein (excluding O&M), the construction cost is based on of the Cost of the Work as described in Article 2.3 above.

3.1.1.3 LUMP SUM FIXED PRICE

The Cost of the Work is guaranteed by the Contractor to be $3,266,409 (not including the cost of financing and bonds) subject to additions and deductions by changes in the Task Order work as provided in the Contract. Such sum as adjusted by approved changes in the Task Order work is hereinafter referred to as the Lump Sum Fixed Price. Costs which would cause the Lump Sum Fixed Price to be exceeded shall be paid by the Contractor without reimbursement by the Government. Upon completion of the installation, the final cost and savings will be reconciled according the following Reconciliation Schedule.

Reconciliation Schedule

System	System Cost	Energy Savings	O&M Savings
4 ton (1980 and older)	$ 714.50	$149.75	$52.36
3 ton (1980 and older)	$ 575.50	$112.31	$52.36
2.5 ton (1980 and older)	$ 538.50	$93.59	$52.36
2 ton (1980 and older)	$ 495.50	$74.87	$52.36
3 ton (1984 and 1985)	$ 575.50	$51.48	$52.36
2.5 ton (1984 and 1985)	$ 538.50	$42.90	$52.36
2 ton (1984 and 1985)	$ 495.50	$34.32	$52.36

System	System Cost	Energy Savings
Kitchen Aerator	$ 13.80	$3.27
Lavatory Aerator	$ 13.80	$3.54
Shower Head	$ 43.50	$28.48

3.1.1.4 CHANGES IN THE TASK ORDER WORK

Equitable adjustments to the Lump Sum Fixed Price will be made on account of changes in the Task Order Work subsequent to the execution of the Task Order and may be determined by any of the methods listed in Contract.

3.1.1.5 COST TO BE REIMBURSED

The term "Cost of the Work" shall mean cost necessarily incurred by the Contractor in the proper performance of the Take Order work. The Cost of the Work shall include only the items set forth in this Article.

3.1.1.6 LABOR COSTS

.1 Wages of construction workers directly employed by the Contractor to perform the construction of the Work at the site, or at off-site workshops.

.2 Wages or salaries of the Contractor's supervisory and administrative personnel when stationed at the site.

.3 Wages and salaries of the Contractor's supervisory or administrative personnel engaged, at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

.4 Wages and salaries to Contractor's auditors, engineers, and other in-house employees, but only for that portion of their time required for work and services performed after the approval of the feasibility study.

.5 Costs paid or incurred by the Contractor for taxes, insurance, contributions, assessments and benefits required by law or

collective bargaining agreements and for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided that such costs are based on wages and salaries.

3.1.1.7 SUBCONTRACT AND CONSULTAINT COSTS

Payments made by the Contractor to Subcontractors and third party Consultants (e.g., engineering firms) in accordance with the requirements of the subcontracts and consultant's agreements.

3.1.1.8 COSTS OF MATERIALS AND EQUIPMENT INCORPORATED IN THE COMPLETED CONSTRUCTION

.1 Costs including transportation and storage of materials and equipment incorporated or to be incorporated in the completed construction.

.2 Costs of materials in excess of those actually installed but required to provide reasonable allowance for waste and for spoilage. Unused excess materials, if any, shall be handed over to the Government at the completion of the Work or, at the Government's option, shall be sold by the Contractor: amounts realized less the cost of sale, if any, from such sales shall be credited to the Government as a deduction from the Cost of the Work.

3.1.1.9 COSTS OF OTHER MATERIALS AND EQUIPMENT, TEMPORARY FACILITIES AND RELATED ITEMS

.1 Costs including transportation, installation, maintenance, dismantling and removal of materials, supplies, temporary facilities, machinery, equipment, and hand tools not customarily owned by the construction workers, which are provided by the Contractor at the site and fully consumed in the performance of the Work; and cost less salvage value on such items if not fully consumed, whether sold to others or retained by the Contractor.

Cost for items previously used by the Contractor shall mean fair market value.

.2 Rental charges for temporary facilities, machinery, equipment, and hand tools not customarily owned by the construction workers, which are provided by the Contractor at the site, whether rented from the Contractor or others, and costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof.

.3 Costs of removal of materials, equipment, and debris from the site.

.4 Reproduction costs, costs of telegrams, facsimile transmissions and long-distance calls, postage and express delivery charges, telephone service at the site and reasonable petty cash expenses of the site office.

.5 That portion of the reasonable travel and subsistence expenses of the Contractor's personnel incurred while traveling in discharge of duties connected with the Task Order work.

.6 The Contractor's capital expenses, including interest on the Construction Manager's capital employed for the Work.

3.1.1.10 MISCELLANEOUS COSTS

.1 That portion directly attributable to this Contract of premiums for insurance and bonds.

.2 Sales, use or similar taxes imposed by a governmental authority which are related to the Task Order work and for which the Contractor is liable.

.3 Fees and assessments for the building permit and for other permits, licenses and inspections for which the Contractor is required by the Contract to pay.

.4 Fees of testing laboratories for tests required by the Contract or Government, except those related to nonconforming Task Order

work other than that for which payment is permitted by Clause above.

.5 Royalties and license fees paid for the use of a particular design, process or product required by the Contract: the cost of defending suits or claims for infringement of patent or other intellectual property rights arising from such requirements by the Contract: payments made in accordance with legal judgments against the Contractor resulting from such suits or claims and payments of settlements made with the Government's consent; provided, however, that such costs of legal defenses, judgments and settlements shall not be included in the calculation of the Lump Sum Fixed Price.

.6 Contractor's accounting and data processing costs related to the Task Order work.

.7 Deposits lost for causes other than the Contractor's negligence or failure to fulfill a specific responsibility to the Government set forth in this Agreement.

.8 Legal mediation and arbitration costs, other than those arising from disputes between the Government and Contractor reasonably incurred by the Contractor in the performance of the Task Order work.

.9 Expenses incurred in accordance with the Contractor's standard personnel policy for relocation and temporary living allowances of personnel required for the Task Order work, in case it is necessary to relocate such personnel from distant locations.

3.1.1.11OTHER COSTS

.1 other costs incurred in the performance of the Task Order work except those costs expressly set forth in above.

3.1.1.12 EMERGENCIES AND REPAIRS TO DAMAGED OR NONCONFORMING WORK

The Cost of the Work as described above shall also include costs which are incurred by the Contractor:

.1 In taking action to prevent threatened damage, injury or loss in case of an emergency affecting the safety of persons and property.

.2 In repairing or correcting damaged or nonconforming Work executed by the Contractor or the Contractor's Subcontractors or suppliers, provided that such damaged or nonconforming Work was not caused by the negligence or failure to fulfill a specific responsibility to the Government set forth in the Contract of the Contractor or the Contractor's foremen, engineers or superintendents, or other supervisory, administrative or managerial personnel of the Contractor or the failure of the Contractor's personnel to supervise adequately the Work of the Subcontractors or suppliers, and only to the extent that the cost of repair or correction is not recoverable by the Contractor from insurance, Subcontractors or suppliers.

3.1.1.13 COSTS NOT TO BE REIMBURSED

The Cost of the Work shall not include:

.1 Salaries and other compensation of the Contractor's personnel stationed at the Contractor's principal office or offices other than the site office, except as specifically above.

.2 Expenses of the Contractor's principal office and offices other than the site office except as specifically provided above.

.3 Overhead and general expenses, except as may be expressly included above.

.4 Rental costs of machinery and equipment, except as specifically provided above.

.5 Except as provided above the costs due to the negligence of the Contractor or to the failure of the Contractor to fulfill a specific responsibility to the Owner set forth in this Agreement.

.6 Costs incurred in the performance of construction services prior to the Government's approval of the feasibility study.

.7 Costs which would cause the Lump Sum Fixed Price to be exceeded.

3.1.2 List of Providers

CES/Way intends to secure financing from GE Capital, Oppenheimer, or Koch Financial Corporation. Some of the providers from which the Company has obtained financing for past projects and from which financing could be available for Fort Leonard Wood include:

Selected Sources of Financing
For Past CES/Way Projects

Oppenheimer & Co., Inc.
Elizabeth Jick
Sr. Vice President
1 Federal Street, 22nd Floor
Boston, Massachusetts 02110
(617) 428-5515

Compass Bank
Mr. Charles DeLacey
Vice President
P. O. Box 13120
Houston, TX 77219
713/867-1081

Koch Financial Corporation
Jeff Thompson
4111 E. 37th Street North
Wichita, Kansas 67220
800/532-6864

Stephens Investments, Inc.
David R. Blumhardt
Vice President
111 Center Street
Little Rock, Arkansas 72201
800/643-9691

Dana Commercial Credit
1900 Indian Wood Circle
Maumee, Ohio 43537-4037
Mr. Jon Ahlberg
419/891-7525

3.1.3 Letter of Interest

A letter of interest from GE Capital is provided in Appendix I.

3.1.4 Financing costs

Financing costs include: Performance Bond, Finance Fees to Lessor (Legal, insurance, placement, closing, etc.), and Construction Interest (capitalized). Debt Service payments are payments to pay off the total

financed amount at the financed interest rate. The total financed amount includes the total construction cost plus financing costs.

3.2 Risk Mitigation

CES/Way has 13 years experience with performance-based, long-term contracts to implement energy savings measures. CES/Way believes that the essence of these agreements is that CES/Way assumes all risk that the energy savings measures that it proposes or designs will, in fact, be economically justified. This means that the resulting savings will at least pay for the amortized cost of implementing the energy savings measures, including CES/Way's fees.

The risks associated with performance contracting fall into the following categories:

- Energy Audits and Engineering
- Construction Cost and Implementation
- Achievement of Guaranteed Savings
- Financial Strength of Performance Contractor and Ability to Back Up Guarantees (i.e. amortize financing)

CES/Way assumes responsibility for the risks associated with all of these categories, except in instances where the customer has acted in such a way that reduces the savings that are achieved or increases the project costs. The specific actions that are most likely to have this effect are:

- Delays in construction due to customer needs
- Increases in project costs due to changed customer requirements
- Increases in building occupancy or changes in the use of buildings that increase energy usage

CES/Way assumes the full risk of conducting the feasibility study and detailed audit without being paid and without guarantees that a financially viable project will be identified, implemented, and result in savings for which the customer makes payments. These risks are mitigated by the fact that:

- The company uses existing, in-house personnel for much of this work and therefore does not incur unnecessary outside indebtedness to subcontractors
- The progression from feasibility study to the other phases allows for work to cease on a facility that has no economically justified project.

- CES/Way's past experience, extensive technical knowledge and comprehensive approach almost always enables it to identify an economically feasible project.

Savings estimates must necessarily be based on the energy economics *which exist when the project is conceived.* CES/Way endeavors to design and finance the projects so that the savings will exceed the amounts needed to amortize the project costs. CES/Way normally expects to share with the owner any excess savings through the Contractor share. However, if the savings are not sufficient to cover the project cost, due to factors within CES/Way's control, CES/Way must absorb these losses.

CES/Way designs technically sound energy savings measures. The Company has an outstanding record of achieving and exceeding its savings guarantees, having achieved well in excess of 99% of the cumulative dollar amount for all projects. CES/Way has had only two small projects show a negative cash flow, which cumulatively amounts to less than $10,000 per year.

CES/Way believes that energy savings projects should be entered into by the parties in the spirit of a partnership versus the typical vendor/procurement officer adversarial relationship. While CES/Way will assume the risks of implementing a technically capable conservation project, the customer will, in general, assume the risks associated with events which neither CES/Way nor the customer can influence; and both will jointly share certain risks which can be partially controlled or quantified.

Mitigation of Risks Which CES/Way Assumes:

Project Design & Construction. CES/Way, like any professional developer, assumes the risk that project equipment is properly designed and constructed in a timely manner. An inappropriately designed, poorly constructed, or slowly built project could lead to construction cost overruns and an up-front financial loss for CES/Way. In addition, delays can impact the achievement of the projected energy savings required to amortize the project investment.

Additionally, the financing arrangement proposed herein is designed to ensure that no risk is assumed by the owner during the construction phase. The owner will not be required to make any payments until the equipment has been installed and beneficial use is delivered to the owner, and savings have been achieved. The parties might agree, however, to

phase the completion of systems in a readily measurable basis, and commence phases of Task Orders into savings calculations as they are completed; e.g., a floor of lighting, etc.

CES/Way monitors project costs on a computerized job cost accounting system that is based upon the percentage of completion construction cost accounting method. Progress is measured by comparing costs incurred to date, as a percentage of completion, versus the estimated percentage of physical work completed as measured by the owner's project manager and confirmed by the CES/Way project manager. At CES/Way, each project is reviewed monthly by the Senior Vice President and remedial action is then taken to correct exceptions.

Cost overruns, if caused by factors within CES/Way's control, would be absorbed by CES/Way; therefore, no financial impact would be incurred by the owner.

Periodic punch lists are prepared by the CES/Way project manager to ensure compliance of quality standards and timeliness of work performance by subcontractors. CES/Way utilizes a very stringent subcontract agreement to clearly define both its and its customer's rights to performance.

The CES/Way team has installed millions of dollars of mechanical and electrical work, as evidenced by the project references provided in this response. As a performance contractor, CES/Way is especially knowledgeable in all phases of construction, especially mechanical and electrical items, the ones that consume most of the energy in a facility.

Savings Analysis. CES/Way has developed proprietary methods to evaluate the potential savings under a variety of conditions. Still, the final determination that a project will achieve expected *energy unit savings* is largely an engineering judgment based on experience. If the judgment was easily made, CES/Way's services would be of limited value. Ultimately, CES/Way must select a probable set of conditions and the most probable energy unit savings realization. Based upon these estimated outcomes it develops a financing plan. CES/Way assumes the risk that its estimates of energy unit savings will be achieved; it assumes much of the risk that the energy unit savings will result in a dollar

savings which is at least equal to the fixed debt service payments required to finance the project cost.

Financing CES/Way *pays debt service* even when monetary *savings* temporarily fall short of the debt service. The risks associated with shared savings under this plan are virtually non-existent for the customer because it would only pay a predetermined amount or share of the achieved savings to CES/Way on a monthly basis. If there are no savings achieved, there are no payments required to CES/Way.

Operations CES/Way controls these costs by installing high quality equipment, by designing rigorous, planned maintenance programs, by carefully monitoring system performance, and by subcontracting repair and maintenance to local contractors who can provide responsive, timely service at a reasonable cost. CES/Way draws on the substantial expertise of its own staff and its affiliates to address any unusual operating conditions and it is not, therefore, simply dependent on a local contractor with inadequate skills.

Shared Risks

General Inflation Operating and maintenance, monitoring, and measurement and verification costs tend to follow general inflation trends. CES/Way applies an inflationary factor of 2.4% when determining the contractor payments for these functions. CES/Way assumes the risk of inflation occurring in excess of 2.4%. The customer assumes the risk of inflation staying below 2.4%. This factor is also applied to operations and maintenance savings.

Other Risks Which CES/Way Does Not Assume:

Utility Rates: The utility rates used to assign a monetary value to energy savings are established at the time a contract is signed. This ensures the economic viability of the project for the term of the contract. The customer receives all of the benefits of any rate decreases that may occur while still benefiting from a lower energy usage resulting from CES/Way's ECMs. If utility rates rise, the customer still benefits from lower energy usage.

3.3 Ownership

CES/Way will own the equipment that it has financed for the term of the contract (amortization period). At the end of the contract, full ownership will be transferred to Fort Leonard Wood.

3.4 Estimated Costs and Savings

The tables provided in Appendix J show the estimated costs and savings as well as a copy of a sample bill. The first table is the financial model for the project. The financial model shows the financial and on-going M&V costs. The second table shows the implementation costs and annual savings specific to each ECSM. The cost breakouts are detailed in the subsequent tables. The breakouts include design costs, construction costs, and costs for developing and commissioning the M&V plan. The final pages show a sample project bill statement.

3.5 Termination Schedules

Refer to Appendix K for termination schedules.

Appendix A

Appendix B

98.0[illegible]	[illegible]	B	A/C KEEPS RUNNING AND AIR IS NOT COOL
98.06.24	08459	A	A/C NOT COOLING
98.06.24	08483	B	A/C NOT COOLING RUNS ALL THE TIME WATER AROUND IT
98.06.24	04254	B	A/C INOP THREE REGISTERS DON'T CLOSE CALL BEFORE GOING
98.06.24	07006	A	A/C INOP
98.06.24	04356	B	A/C INOP
98.06.24	08855	A	A/C SEEMS TO BE COOLING BUT NOT GETTING COOL AIR INTO HOUSE--HOUSE IS HOT
98.06.24	04285	A	A/C NOT COOLING NOT VERY MUCH AIR FLOW
98.06.24	04701	B	A/C NOT COOLING HOME AFTER 1300 TODAY
98.06.24	04218	B	A/C NOT COOLING CALL FOR ACCESS 6-0445 IF NEEDED TO GET INTO HOUSE
98.06.24	**04004**	**A**	**NO A/C**
98.06.24	08253	A	NO A/C
98.06.24	08770	A	NO A/C
98.06.24	08855	A	NO A/C AFTERNOON
98.06.24	07018	B	REPLACE A/C UNIT
98.06.24	08913	B	A/C INOP
98.06.24	09328	A	A/C NOT COOLING
98.06.24	08228	B	A/C NOT COOLING
98.06.24	04327	B	A/C INOP
98.06.24	09013	A	BLDG 9013A 299 INDIANA AVE A/C INOP
98.06.24	08958	A	A/C NOT COOLING
98.06.24	08780	B	A/C NOT COOLING
98.06.24	04307	B	A/C INOP
98.06.24	09425	B	A/C INOP
98.06.24	07010	A	A/C INOP HOME AFTER 1400
98.06.24	08622	A	A/C KEEPS TRIPPING CIRCUIT BREAKER
98.06.24	08484	A	A/C NOT COOLING
98.06.24	08300	E	A/C MAKING SQUEALING NOISE
98.06.24	04213	B	A/C NOT COOLING
98.06.24	07044	H	A/C
98.06.24	04641	A	A/C NOT COOLING CALL TO MEET IF NEEDED 6 0776
98.06.25	07251	B	A/C INOP
98.06.25	08702	A	A/C INOP
98.06.25	08913	B	NO A/C
98.06.25	04600	A	NO A/C
98.06.25	08486	A	A/C NOT COOLING
98.06.25	**08829**	**D**	**A/C NOT WORKING PROPERLY, HOME FRI MORNING 26 JUN WORK # 3 4014 CPL STRATMAN**
98.06.25	08738	B	A/C NOT COOLING
98.06.25	08931	A	A/C INOP **HOUSE IS TOO HOT, 82 DEGREES & I CONTACTED PAUL AT INSP DUE TO D & D
98.06.25	08779	B	A/C NOT COOLING
98.06.25	09101	C	BLDG 9101C 5 IMMELL A/C INOP
98.06.25	04426	A	A/C INOP
98.06.25	08411	A	A/C INOP
98.06.25	08419	A	A/C INOP
98.06.25	07025	B	A/C NOT COOLING PROPERLY
98.06.25	08958	A	A/C ONLY WORKS PART OF TIME AGAIN
98.06.25	04852	B	COMPRESSOR FOR A/C NOT WORKING
98.06.25	04265	B	EXTEND DRAIN ON A/C
98.06.25	08554	B	A/C NOT COOLING HOME UNTIL 3:00 ON FRIDAY
98.06.25	04741	A	A/C INOP (HASN'T WORKED SINCE AIR FILTER WAS PUT ON TODAY)
98.06.25	09011	C	BLDG 9011C 303 INDIANA A/C INOP
98.06.26	08625	B	A/C NOT COOLING
98.06.26	04631	A	A/C INOP
98.06.26	08462	B	A/C NOT COOLING
98.06.26	07302	C	A/C INOP PLEASE CALL IF NEEDED SP MINGILTON 6 1225
98.06.26	04617	B	A/C INOP NEIGHBOR IS HOUSE SETTING-SHE IS AT 45 JADWIN
98.06.26	07251	B	A/C BLOWING HOT AIR
98.06.26	04511	A	A/C INOP
98.06.26	08523	B	A/C INOP
98.06.26	08555	B	A/C INOP
98.06.26	04357	A	A/C NOT COOLING CALL FOR ACCESS IF NEEDED 6 3653 OR 6-0311
98.06.26	07214	B	A/C NOT COOLING CALL IF NEEDED 6-7134 WAS TOLD LAST YEAR THAT DUCT WORK WA
98.06.26	08497	A	A/C INOP
98.06.26	08936	A	A/C NOT COOLING

(Contractor must submit four copies of Invoice)

OMB No. 0704-0187
Expires Jun 30, 1997

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0187), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR FORM TO EITHER OF THESE ADDRESSES.
SEND YOUR COMPLETED FORM TO THE PROCUREMENT OFFICIAL IDENTIFIED IN ITEM 6.

CONTRACT/[illegible] NO.	2. DELIVERY ORDER NO.	3. DATE OF ORDER.	4. REQUISITION/PURCH REQUEST NO.	5. PRIORITY
DABT31-95-D-0021	0048	98JUN10	DPWFHM-8160-N058	

6. ISSUED BY	CODE	DABT3101	7. ADMINISTERED BY	CODE	DOC-CA	8. DELIVERY FOB
DIRECTORATE OF CONTRACTING [illegible] 573-596-0267 P.O. BOX 140 FT LEONARD WOOD MO 65473-0140 [illegible] Snider C77 (573) 596-0256			DIRECTORATE OF CONTRACTING CONTRACTING DIVISION PO BOX140 FT LEONARD WOOD MO 65473-0140			[X] DEST [ ] OTHER (See Schedule)

CONTRACTOR Vendor Id: 000207B2	CODE	OKG85	FACILITY CODE		10. DELIVER TO FOB POINT BY	11. MARK IF BUS. IS
					98JUL31	[X] SMALL [ ] SMALL DISAD VANTAGED [ ] WOMEN-OWNED
NAME AND ADDRESS	D & D HEATING AND COOLING INCORPORATED 24816 JUNIPER ROAD LEBANON MO 65536				12. DISCOUNT TERMS 0Z 00 Days Net 030	
					13. MAIL INVOICES TO See Block 15	

14. SHIP TO	CODE	W58CEW32	15. PAYMENT WILL BE MADE BY	CODE	S23037	MARK ALL PACKAGES AND PAPERS WITH CONTRACT OR ORDER NUMBER
[illegible] INSPECTION BRANCH BLDG 2202 FT LEONARD WOOD MO 65473-5000		DABT3195D0021 /0048	DFAS LAWTON-FT SILL OPLOC (VENDOR PAY) PHONE (888) 445-5154 FAX (405)442-7668 4700 MOW WAY RD DEPT 1791 (DFAS-LW-FPV) FORT SILL OK 73503-1791		EFT: T	

DELIVERY	X	This delivery order is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
PURCHASE		Reference your JULY 98 furnish the following on terms specified herein

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED (YYMMDD)

If this box is marked, supplier must sign Acceptance and return the following number of copies:

ACCOUNTING AND APPROPRIATION DATA/LOCAL USE
2187025000005710901921310000025CZ90Y202DPWFHM8160N058Y20290S2303? Award Oblig Amt US$ 41 393.98

ITEM NO.	19 SCHEDULE OF SUPPLIES/SERVICE	20. QUANTITY ORDERED/ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	Maintenance and Repair of Heating and Air Conditioning in Family Housing for the period of 1 - 31 July 1998. Invoices received for monies in excess of this delivery order are not				

*Quantity accepted by the Government is same as quantity ordered, indicate it. If different, enter actual quantity accepted below quantity ordered and encircle.	24. UNITED STATES OF AMERICA BY: Donald F. Blotzer 008 CONTRACTING/~~ORDERING~~ OFFICER	25. TOTAL $ ~~41393.98~~	29. DIFFERENCES 33,818.38

*QUANTITY IN COLUMN 20 HAS BEEN	27. SHIP. NO.	28. D.O. VOUCHER NO.	30. INITIALS
[ ] EXPECTED [X] RECEIVED [ ] ACCEPTED AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED	[ ] PARTIAL [X] FINAL		
8/5/98 Patrick H. Brugger DATE SIGNATURE OF AUTHORIZED GOVERNMENT REP.	31. PAYMENT	32. PAID BY	33. AMT VERIFIED CORRECT FOR
I certify this account is correct and proper for payment	[ ] COMPLETE [ ] PARTIAL [ ] FINAL		34. CHECK NUMBER
DATE SIGNATURE AND TITLE OF CERTIFYING OFFICER			35. BILL OF LADING NO.

REC'D AT	38. RECEIVED BY (Print)	39. DATE REC'D (YYMMDD)	40. TOTAL CONT.	41. S/R ACCOUNT NUMBER	42. S/R VOUCHER NO.
	Patrick H. Brugger	8/5/98			

Form 1155, JUN 94 PREVIOUS EDITIONS MAY BE USED. 480/12

D & D HEATING AND COOLING INCORPORATED

ITEM NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	U/I	UNIT PRICE	AMOUNT
(continued)	authorized for payment.				
55	Charge for routine service calls as described in paragraph C.5.1.c (HVAC)	~~248~~ 260.00	EA	21.200000	~~5257.60~~ 5512.00
56	Charge for routine service calls as described in paragraph C.1.7.5 (Hot Water Heaters Only)	34 ~~30.00~~	EA	17.960000	610.64 ~~538.80~~
57	Charge for emergency service call as described in paragraph C.1.7.3 (HVAC ?)	~~70~~ 25.00	EA	78.360000	~~5485.20~~ 1959.00
	The following Bid Items (58-67) are for labor for the replacement of the following items. These items shall not be replaced without prior approval from the Contracting Officer.				
58	Coil - A/C evaporator	3 ~~1.00~~	EA	51.920000	155.76 ~~51.92~~
59	Compressor - A/C	1.00	EA	46.680000	46.68
60	Condenser unit - complete with compressor controls, etc.	32 ~~50.00~~	EA	46.680000	1493.76 ~~2334.00~~
63	Furnace, gas	0 ~~2.00~~	EA	78.360000	0 ~~156.72~~
64	Install gas piping	0 ~~1.00~~	LF	1.060000	0 ~~1.06~~
65	Package thermostats	39 ~~15.00~~	EA	6.240000	243.36 ~~93.60~~
66	Replace gas hot water heater	4 ~~5.00~~	EA	46.680000	186.72 ~~233.40~~

D & D HEATING AND COOLING INCORPORATED

M NO.	SCHEDULE OF SUPPLIES/SERVICE	QUANTITY	U/I	UNIT PRICE	AMOUNT
7	Replace electric hot water heater	~~10.00~~ 2	EA	46.680000	~~466.80~~ 93.36
8	PARTS AND MATERIALS	1.00	LT	30000.000000	~~30000.00~~ 20245.30

Appendix C

Equipment Inspected				
Address	**Unit Type**	**Model Number**	**Serial Number**	**EER**
82 Montrose	Ruud	Not readable	Not readable	
19 Montrose	Rudd	UAFC-030JAO	3783-3785 8785	8.6
31 Parrish	Trane	OAUA-252-B	C81A-O8456	7.5
1 Boquet	Arcoaire	Not readable	Not readable	
43 Elwood	Arcoaire	Not readable	Not readable	
45 Elwood	Intertherm	S36A-O3OK	S389 607-12168	not avail.
38 Evans	Inner City Products	CA5530VKA867.83640	L940982175	not avail.
42 Evans	Singer	ACR50130-1A-39	114107-6-15-9768	7.4

Appendix D

Neighborhood	Street Name	House type	Sq footage	Quantity	Type	Size	Age	Number	Occupied	3 replace2.5
S. Lieber Heights	Barger	1,2 plex	1567-2240	2-11	Trane	2.5	80	25	1	2
Occupied	Barger	1,2 plex	1120-2016	1-7	Trane	2	80	14	1	
	Barkley	Quadplex	4784	9	1196					
	Barkley	Sixplex	7152	3	1192					
	Barkley	Eightplex	9520	1	1190					
S. Lieber Heights	Barkley	Duplex	2240-2709	18	Ruud	2.5	84	36	1	
Occupied	Barkley	Duplex	2016	29	Ruud	2	84	120	1	
N. Lieber Heights	Boquet				ArcoAire	3	85	10	0	
Not Occupied	Boquet				ArcoAire	2.5	85	18	0	
S. Lieber Heights	Burr	Duplex	2240	6	Ruud	2.5	79	12	1	
Occupied	Burr	Duplex	2016	3	Ruud	2	79	6	1	
N. Lieber Heights	Cable	Duplex	2970-2908	7-11	Ruud	3	76	18	1	
Occupied	Cable				ArcoAire	3	85	1	1	
	Cable	Quadplex	4332	3	ArcoAire	2.5	85	17	1	
	Cable	Duplex	2721	4	Singer	3	76	20	1	
	Cable	Quadplex	4944	3	Singer	2.5	76	16	1	
S. Lieber Heights	Collier	1,2,4 plex	1567-2240-471-912		Trane	2.5	80	27	1	1
Occupied	Collier	Duplex	2016	8	Trane	2	80	16	1	
S. Lieber Heights	Daniels	2,4 plex	2432, 5492	4, 4	Ruud	2.5	84	20	1	
Occupied	Daniels	Duplex	2746-2995	3	ArcoAire	3	85	9	1	
Officer Housing	Delafield	Duplex	2128-2408	36-1	Ruud	2.5	79	68	1	
Occupied	Delafield	Single family	1626-1737	10	York	3	75	8	1	11
N. Lieber Heights	Diamond	2,4 plex	2908-5816	19-2	Singer	3	76	48	1	
Occupied	Diamond	Quadplex	4944-5193	7	Singer	2.5	76	24	1	
	Diamond				Singer	2	76	8	1	
	Diamond	Quadplex	5442	3	York/Ruud	3	75	14	1	
S. Lieber Heights	Ellis	Single family	1120-1567	2-1	Ruud	2.5	79	12	1	1
Occupied	Ellis	Duplex	2016-2128	18-1	Ruud	2	79	2	1	
	Ellis	Duplex	2240-2463-2717-7525		Trane	2.5	80	106	1	
	Ellis				Trane	2	80	26	1	
	Ellis				Ruud	3	84	2	1	
	Ellis	Quadplex	4784	11	Ruud	2.5	84	25	1	
	Ellis				Ruud	2	84	8	1	

N. Lieber Heights	Elwood	Duplex	2721-2970	26	Ruud	3	75	45	1	
Occupied	Elwood				ArcoAire	3	85	7	1	
	Elwood	Quadplex	4944	1	ArcoAire	2.5	85	34	1	
N. Lieber Heights	Epps	Duplex	2970-2908	10-8	Singer	3	76	22	1	
Occupied	Epps	Duplex	2721	7	Singer	2.5	76	7	1	
	Epps	4,8 plex	4332-8724	1-1	Singer	2	76	8	1	
	Epps				York/Ruud	3	75	27	1	
N. Lieber Heights	Evans	Duplex	2908	1.5	Singer	3	76	3	1	
Occupied	Evans	Quadplex	4944	7	Singer	2.5	76	28	1	
S. Lieber Heights	Forrest				Ruud	2.5	84	64	1	
Occupied	Forrest				Ruud	2	84	47	1	
N. Lieber Heights	Frizell	2,4 plex	2908-5816	20-5.2	Singer	3	76	49	1	
Occupied	Frizell	Quadplex	4944	2	Singer	2.5	76	8	1	
	Frizell	Quadplex	4332	1	Singer	2	76	4	1	
S. Lieber Heights	Funk	Duplex	2240	20	Ruud	2.5	79	34	1	
Occupied	Funk	Duplex	2016	9.5	Ruud	2	79	10	1	
	Funk	Single family	1567	2	Ruud	2.5	84	11	1	2
	Funk	Single family	1120	3	Ruud	2	84	9	1	
Officer Housing	Goethals	Duplex	2128-2408	10.5	Ruud	2.5	78	6	1	
Occupied									1	
Officer Housing	Gridley Loop	Single family	1530	8	Ruud	2.5	78	8	1	8
Occupied	Gridley Loop	Single family	1787	5	York/Ruud	3	75	5	1	
N. Lieber Heights	Gywnne	Duplex	2908	9	Singer	3	76	18	1	
Occupied	Gywnne	Duplex	2472	2	Singer	2.5	76	3	1	
S. Lieber Heights	Hatler	2,4 plex	2996-5992	13-2	York/Ruud	3	75	30	1	2
Occupied	Hatler	2,4,4 plex	2240-4992-52	9.5-20-3	Ruud	2.5	84	113	1	
	Hatler	Duplex	2016	5	Ruud	2	84	10	1	
	Hatler				ArcoAire	3	85	2	1	
Officer Housing	Humphrey	Duplex	2732-3684	22.5	Ruud	2.5	78	49	1	49
Occupied	Humphrey	Duplex	3211	4	York/Ruud	3	75	4	1	
N. Lieber Heights	Immell				ArcoAire	3	85	12	0	
Not Occupied	Immell				ArcoAire	2.5	85	20	0	
N. Lieber Heights	Indiana				ArcoAire	3	85	31	0	
Not Occupied	Indiana				ArcoAire	2.5	85	171	0	
	Indiana				York/Ruud	3	75	10	0	

Officer Housing	Jadwin	Duplex	2128-2408		28	Ruud	2.5	78	56	1	
Occupied										1	
Officer Housing	Kirby	Single family			4	Ruud	4	78	4	1	
Occupied	Kirby	Single family	1488-1604		24	Ruud	3	78	23	1	
S. Lieber Heights	Kelly	Duplex	2240		8	Ruud	2.5	84	16	1	
Occupied	Kelly	Duplex	2128		0.5	Ruud	2	84	1	1	
S. Lieber Heights	Knight	Duplex	2746-2995		11	York	3	75	26	1	
Occupied	Knight	Quadplex	4992		5	Ruud	2.5	84	35	1	
	Knight	Quadplex	5248-5492		5	Mac Aire	3	75	31	1	
Officer Housing	MacKenzie	Single family	1716-2116		12	Ruud	4	78	12	1	
Occupied	MacKenzie	Single family	1260-1580		21	Ruud	3	78	21	1	
S. Lieber Heights	Montrose	2,4 plex	2432, 4992	2,19		Ruud	2.5	84	74	1	
Occupied	Montrose	Duplex	2746-2995		8	York/Ruud	3	75	22	1	
	Newton	Duplex	2128-2408		5	Ruud	2.5	78	10	0	
										1	
S. Lieber Heights	Peden	Duplex	2240		4	Ruud	2.5	79	28	1	
Occupied		84 plex	9520-4784	1,3						1	
S. Lieber Heights	Phoenix	Duplex	2496		1	Ruud	2.5	84	6	1	
Occupied		Quadplex	4992		1					1	
Officer Housing	Pick	Duplex	2128-2408		9	Ruud	2.5	78	8	1	
Occupied										1	
S. Lieber Heights	Parrish	Duplex	2240-2128	27,1		Ruud	2.5	79	68	1	
Occupied	Parrish	Duplex	2016		10	Ruud	2	79	2	1	
	Parrish	2,4 plex	2686-2784	1,9		Trane	2.5	80	26	1	
	Parrish					Trane	2	80	18	1	
S. Lieber Heights	Sheppard	2,4 plex	2432, 4992	3,18		Ruud	2.5	84	65	1	
Occupied	Sheppard	6 plex	7152		2	Ruud	2	84	20	1	
	Sheppard	Duplex	2746-2995		6	York/Ruud	3	75	15	1	
Officer Housing	Siebert	Duplex	2128-2408		12	Ruud	2.5	78	22	1	
Occupied										1	
S. Lieber Heights	Specker	4,6,8,2 plex	like Barkley	6,1,2,.5		Ruud	2	84	47	1	
Occupied	Specker	Duplex	2240		6	Ruud/Singel	2.5	79	16	1	
	Specker	Single family	1667		1						1
Officer Housing	Swift	Duplex	3240		12	Ruud	3	78	32	1	
Occupied	Swift	Duplex	2732-3084		11.5	Ruud	2.5	78	25	1	25

[redacted]	Taylor	[redacted]							0	
Officer Housing	Thayer	Duplex		2	Rudd	3	78	2	1	
Occupied	Thayer	Duplex	2732-3084	24.5	Rudd	2.5	78	49	1	49
Officer Housing	Totten	Duplex		2		3	78	4	1	1
Occupied	Totten	Duplex	2732-3084	38	Rudd	2.5	78	75	1	75
S. Lieber Heights	Turner	8-6-4-2-plex	9520-7152-4726292	4	Rudd	2.5	79	10	1	
Occupied	Turner	Duplex	2016	9	Rudd	2	79	18	1	
	Turner			1	2	3	2	2	1	2
Officer Housing	Wheeler	Duplex	2732-3084	18	Rudd	2.5	78	36	1	36
Occupied	Wheeler	Duplex	3397	1	York/Rudd	3	75	2	1	
Officer Housing	Williams	Duplex	2732-3084	18.5	Rudd	2.5	78	46	1	46
Occupied	Williams	Duplex	3211	9	York/Rudd	3	75	9	1	
N. Lieber Heights	Young				Singer	3	76	10	0	
Demo some	Young				Singer	2.5	76	4	0	
	Young				Singer	2	76	18	0	
	Total							2823		
					Occupied				2501	311

Type	Size	Age	units	Empty	Revised #	Replaced							Left
						94	95	96	97	98	Total	%	
?	3	?	3		0						0	0%	0
ArcoAire	3	85	72	53	22		1			4	5	7%	17
ArcoAire	2.5	85	260	209	51			1	6		7	3%	44
Mac Aire	3	75	1		1				1		1	100%	0
Ruud	3	84	2		2						0	0%	2
Ruud	2.5	84	465		465			6	7	9	22	5%	443
Ruud	2	84	262		262			2	5	8	15	6%	247
Ruud	2.5	79	326		339			11	9	9	29	9%	310
Ruud	2	79	40		40			1	1		2	5%	38
Ruud	4	78	13		13			1	1		2	15%	11
Ruud	3	78	48		48			1	13	3	17	35%	31
Ruud	2.5	78	523		523	7	26	34	22	22	111	21%	412
Ruud	3	75	63		With York						0	0%	
Singer	3	76	170	4	166	4	4	16	19	8	51	30%	115
Singer	2.5	76	98	1	97	1	3	10	5	7	26	27%	71
Singer	2	76	38	6	32	1		2			3	8%	29
Trane	2.5	80	183		183			5	3	6	14	8%	169
Trane	2	80	74		74				2	2	4	5%	70
York	3	75	34	10	222		2	1	6	1	10	4%	212
Ruud/Singer	2.5	79	13		With Ruud						0	0%	
York/Ruud	3	75	135		With York						0	0%	
Total			2823		2540	13	36	91	100	79	319		2221
						0	1	9	18	21			
						13	35	82	82	58	270		1468
						100%	97%	90%	82%	73%	85%		

ATZT-DPW-EE-USO

21-JUL-98
RON PEMBERTON

FAMILY HOUSING ELECTRICAL USAGE & COST

FOR THE MONTH OF: JUNE 1998

FOR SERVICES RECEIVED THROUGH: 01-JUL-98

AVG = AVERAGE
EMP = EMPTY NOW

BLDG TYPE	METER LOCATION		KWH USAGE	OTHER	# OF UNITS	TOT KWH USAGE		FT2	MONTHLY USE/FT2
X---------- OFFICER'S HOUSING AREA ----------X									
A	12 MACKENZIE		2,346	#4011	3	7,038		1,736	1.3514
B	5 MACKENZIE		1,152	#4006	6	6,912		1,711	0.6733
C	13 MACKENZIE	(AVG)	0	#4014	40	69,395	AVG	1,526	1.1369
Y	3 MACKENZIE		2,515	#4004	3	7,545		1,838	1.3683
D	50-52 GOETHALS		4,657	#4709	63	293,391		2,128	2.1884
E	68-70 GOETHALS		3,172	#4700	49	155,428		2,408	1.3173
F	12 GRIDLEY	(AVG)	0	#4960	13	25,672	AVG	1,737	1.1369
O	2-4 THAYER		1,144	#4200	81	92,664		2,733	0.4187
P	6-8 THAYER		1,905	#4202	19	36,195		3,211	0.5933
S	1 KIRBY	(AVG)	0	#4501	15	25,290	AVG	1,483	1.1369
T	9 KIRBY	(AVG)	0	#4509	9	15,389	AVG	1,504	1.1369
P	54-56 THAYER		2,610	#4230	50	130,500		3,084	0.8463
X---------- NCO'S HOUSING AREA ----------X									
V-4	75-81 CABLE		3,520	#9281	28	98,560		4,944	0.7120
J	18-19 KELLY-FUNK		1,465	#8532	8	11,720		2,128	0.6884
I-4	25-31 TURNER		3,200	#8279	78	249,600		4,784	0.6689
I-6	97-107 TURNER		12,840	#8261	12	154,080		7,152	1.7953
I-8	9-23 TURNER - 2 ELC		16,480	#8281	6	98,880		9,520	1.7311
J	33-35 BARKLEY		1,694	#7015	190	321,860		2,016	0.8403
R	119-121 HATLER		5,314	#8843	44	233,816		2,995	1.7743

R-4	71-77 HATLER	2,080	#8829	55	114,400	:	4,992	0.4167
K	10-12 BURR ST.	2,505	#8357	116	290,580	:	2,016	1.2426
L	87 SPECKER (AVG)	0	#7121	13	23,159	AVG	1,567	1.1369
O	62-64 MONTROSE	1,421	#7350	21	29,841	:	2,432	0.5843
U-4	40-46 FRIZELL	6,240	#9552	30	187,200	:	4,332	1.4404
U-6	1-11 YOUNG	0	#9601	16	0	EMP	6,498	0.0000
U-8	104-118 INDIANA	0	#9052	7	0	EMP	8,664	0.0000
V	32-34 ELWOOD	3,423	#9456	45	154,035	:	2,970	1.1525
V-4	129-135 INDIAN (AVG)	0	#9043	26	0	EMP	5,442	0.0000
W	33-35 IMMELL	0	#9109	81	0	EMP	2,908	0.0000
W-4	87-93 DIAMOND	5,520	#9337	17	93,840	:	5,816	0.9491
W-6	25-35 BOQUET	0	#9111	3	0	EMP	8,724	0.0000

	[KWH'S]
JUNE 1998 FAMILY HOUSING USAGE	
OFFICER'S HOUSING TOTAL USAGE:	865.418
NCO HOUSING TOTAL USAGE:	2,061,571
SUBTOTAL:	2,926,989
LIFT STATION & STREET LIGHTS: (658 KWH X DAYS MTH)	19,740
TOTAL USAGE--->	2,946,729
FAMILY HOUSING COST PER KWH:	$0.0578
TOTAL COST--->	$170,320.95

MONTHLY KWH ON METERS:	85,203	KWH	
METERED FT2:	74,945	FT2	
AVERAGE KWH/FT2/MTH:	1.1369	KWH/FT2/MTH	
TOTAL FT2:	2,957,660	FT2	
TOTAL KWH'S USED:	2,946,729	KWH	
AVG KWH'S USED PER FT2 FOR THE MONTH:	0.9963	KWH/FT2/MTH	
OFFICER'S HOUSING:	828,947	FT2	1.0440 KWH/FT2/MT
NCO'S HOUSING:	2,128,713	FT2	0.9685 KWH/FT2/MT
TOTAL FT2:	2,957,660	FT2	0.9963 KWH/FT2/MT
DEACTIVATED FT2:	567,828	FT2	

Officer Housing

Address	Building #	# of Units	# Metered ACCUs	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec			
				KWH Usage 98'														
3 Mackenzie	4004	3	1	2277	1829	1960	1508	2297	2515	2515	2515	2515	1574	1981	2602	1,910	2,471	2,806
5 Mackenzie	4006	6	1	1033	1093	1192	1064	1574	1152	1152	1152	1152	1264	1892	1071	1,230	1,236	33
12 Mackenzie	4011	3	1	1665	1487	1424	1186	2141	2346	2346	2346	2346	631	2024	732	1,307	2,305	4,990
13 Mackenzie	4014	40	1	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
50 Goethals	4709	63	2	3876	3002	905	2103	3344	4657	4950	2825	3245	2976	2976	3114	2,707	3,804	5,484
52 Goethals	4709	63																
68 Goethals	4700	49	2	2931	2522	2941	2308	2807	3172	5293	4234	3423	2613	3423	2827	2,795	3,786	4,954
70 Goethals	4700	49																
12 Gridley	4960	13	1															
[redacted]																		
2 Thayer	4200	81	2	1091	846	1519	985	1294	1144	1144	1144	1144	1480	1077	1523	1,217	1,174	-216
4 Thayer	4200	81																
6 Thayer	4202	19	2	[redacted]												1,493	2,413	4,602
[redacted]																1,345	2,776	7,152
56 Thayer	4230	50																

NCO Housing

Address	Building #	# of Units	# Metered ACCUs	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg:Ja-A,Oc-De	Avg:Ma-Se	A/C use	Est A/C
				KWH Usage															
33 Barkley	7015	190	2	921	930	769	780	1236	1694	2361	2020	1382	707	890	897	842	1,739	4,483	7942
35 Barkley	7015	190															1984 - 2 ton Ruud		
25 Boquet	9111	3	6																
27 Boquet	9111	3																	
29 Boquet	9111	3																	
31 Boquet	9111	3																	
[redacted]																			7 seer
35 Boquet	9111	3																	1050 hrs
10 Burr	8357	116	2	1564	1535	1728	1474	2307	2505	3424	2641	2660	1203	1445	1442	1,484	2,707	6,115	7200
12 Burr	8357	116															1979 - 2 ton Ruud		
75 Cable	9281	28	4	1760	1760	2480	1120	2480	3520	5760	5040	3440	960	1120	1280	1,497	4,048	12,754	
77 Cable	9281	28																	
79 Cable	9281	28																	
81 Cable	9281	28																	
87 Diamond	9337	17	4	3760	3280	4800	2080	6000	5520	9360	7280	6640	3120	3200	3120	3,337	6,960	18,114	21600
89 Diamond	9337	17															1976 - 3 ton Singers		
91 Diamond	9337	17																	
93 Diamond	9337	17																	
32 Ellwood	9456	45	2	1947	1650	1456	1198	3229	3423	3480	4376	3033	1946	1946	1626	1,681	3,508	9,135	
34 Ellwood	9456	45																	
40 Frizell	9552	30	4	1520	1440	2560	3440	4480	6240	7920	7040	6000	3440	2240	2880	2,503	6,336	19,166	14400
42 Frizell	9552	30															1976 - 2 ton Singers		
44 Frizell	9552	30																	
46 Frizell	9552	30																	
18 Kelly	8532	8	2	1667	1386	1509	1092	1377	1465	2147	1654	1573	1016	1165	1302	1,305	1,643	1,690	
19 Funk	8532	8																	
71 Hatler	8829	55	4	2640	3280	3120	1040	2160	2080	2640	1520	2240	1360	1280	1280	2,000	2,128	640	
73 Hatler	8829	55																	
75 Hatler	8829	55																	
77 Hatler	8829	55																	
119 Hatler	8843	44	2	3097	2801	3028	2687	5255	5314	7295	6691	5697	3407	3270	3916	3,172	6,050	14,391	10800
121 Hatler	8843	44															1975 - 3 ton Yorks		
[redacted]																			
35 Imell	9109	81																	
62 Montrose	7350	21	2	1463	1502	1151	927	1732	1421	1482	2200	2005	946	1083	1115	1,170	1,768	2,992	
64 Montrose	7350	21																	
[redacted]																			
9 Turner	8281	6	8	8720	6720	6960	6640	11760	16480	15360	15440	22640	7840	7200	6640	7,246	16,336	45,451	36000
11 Turner	8281	6															1979 - 2.5 ton Ruud		
13 Turner	8281	6																	
15 Turner	8281	6														Subtotal		84,071	75,600
17 Turner	8281	6																	0.899238
19 Turner	8281	6																	
21 Turner	8281	6																	
23 Turner	8281	6																	
25 Turner	8279	78	[redacted]													2,686	3,824	5,691	
27 Turner	8279	78																	
29 Turner	8279	78																	
[redacted]																			
97 Turner	8261	12	6	9960	9000	10800	6120	13440	12840	16320	5880	5240	8280	8760	9480				
99 Turner	8261	12																	
101 Turner	8261	12																	
103 Turner	8261	12																	

Appendix E

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1980 or older** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**2** tons	Tonnage	**2** tons
Energy Effic. Rating (EER)	7.00 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,050 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.71 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	3,600 kWh
Peak demand (tonnage x efficiency)	3.43 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	2,338 kWh
Peak demand (tonnage x efficiency)	2.46 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1980 or older** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**2.5** tons	Tonnage	**2.5** tons
Energy Effic. Rating (EER)	7.00 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,050 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.71 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	4,500 kWh
Peak demand (tonnage x efficiency)	4.29 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	2,923 kWh
Peak demand (tonnage x efficiency)	3.08 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1980 or older** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**3** tons	Tonnage	**3** tons
Energy Effic. Rating (EER)	7.00 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,050 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.71 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	5,400 kWh
Peak demand (tonnage x efficiency)	5.14 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	3,508 kWh
Peak demand (tonnage x efficiency)	3.69 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1980 or older** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**4** tons	Tonnage	**4** tons
Energy Effic. Rating (EER)	7.00 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,050 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.71 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	7,200 kWh
Peak demand (tonnage x efficiency)	6.86 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	4,677 kWh
Peak demand (tonnage x efficiency)	4.92 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1984 or 1985** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**2** tons	Tonnage	**2** tons
Energy Effic. Rating (EER)	8.25 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,000 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.45 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	2,909 kWh
Peak demand (tonnage x efficiency)	2.91 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	2,338 kWh
Peak demand (tonnage x efficiency)	2.46 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1984 or 1985** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**2.5** tons	Tonnage	**2.5** tons
Energy Effic. Rating (EER)	8.25 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,000 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.45 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	3,636 kWh
Peak demand (tonnage x efficiency)	3.64 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	2,923 kWh
Peak demand (tonnage x efficiency)	3.08 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coil

This spreadsheet shows the savings associated with replacing an existing **1984 or 1985** ACCU and coil with a new ACCU and coil.

Inputs

Existing ACCU		New ACCU	
Tonnage	**3** tons	Tonnage	**3** tons
Energy Effic. Rating (EER)	8.25 Btu/h/W	Energy Effic. Rating (EER)	9.75 Btu/h/kW
Run hours at full load	1,000 hours/year	Run hours at full load	950 hours/year

Outputs

Existing ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.45 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	4,364 kWh
Peak demand (tonnage x efficiency)	4.36 kW
New ACCU	
Efficiency in kW/ton (1 / EER x 1 kW / 1000 W x 12,000 Btu/h/ton)	1.23 kW/ton
Annual Consumption (tonnage x efficiency x run hours)	3,508 kWh
Peak demand (tonnage x efficiency)	3.69 kW

Replace Air Cooled Condensing Unit (ACCU) and Evaporator Coils

This spreadsheet shows the cost and savings associated with replacing an existing ACCU with a new ACCU.

1980 and older ACCUs	going from	1050	cooling hours
	with a	7	SEER unit
	to a	9.75	SEER unit
	at	950	cooling hours
1984 and 1985 ACCUs	going from	1000	cooling hours
	with a	8.25	SEER unit
	to a	9.75	SEER unit
	at	950	

6.185	$/kW demand	
12	demand months	
3	years demand is spaced over	
75%	of units not being load shed	Energy Cost Savings - $178,319
90%	of the non load shed units running	
0.025	$/kWh consumption	
0.0417	$/kWh blended	
8.00%	interest rate on financing	
15	year financing	

2 ton — 137 units at this tonnage

1980 or older

3.43	existing kW	3,600	existing kWh
2.46	new kW	2,338	new kWh
0.65	saved kW	1,262	saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$16.15	$32.30	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	$48.45	
consumption	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	$31.54	
																NPV
subtotal	$47.69	$63.84	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$79.99	$640.88
amoritized	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$74.87	$640.88
blended	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	$52.61	

2.5 ton 651 units at this tonnage

1980 or older

4.29 existing kW 4,500 existing kWh

3.08 new kW 2,923 new kWh

0.82 saved kW 1,577 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$20.19	$40.37	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	$60.56	
consumption	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	$39.42	
																NPV
subtotal	$59.61	$79.80	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$99.98	$801.10
amoritized	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$93.59	$801.10
blended	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	$65.76	

3 ton 669 units at this tonnage

1980 or older

5.14 existing kW 5,400 existing kWh

3.69 new kW 3,508 new kWh

0.98 saved kW 1,892 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$24.22	$48.45	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	$72.67	
consumption	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	$47.31	
																NPV
subtotal	$71.53	$95.75	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$119.98	$961.32
amoritized	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$112.31	$961.32
blended	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	$78.91	

4 ton 11 units at this tonnage

1980 or older

6.86 existing kW 7,200 existing kWh

4.92 new kW 4,677 new kWh

1.31 saved kW 2,523 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$32.30	$64.60	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	$96.89	
consumption	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	$63.08	
																NPV
subtotal	$95.37	$127.67	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$159.97	$1,281.76
amoritized	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$149.75	$1,281.76
blended	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	$105.21	

2 ton 247 units at this tonnage

1984 or 1985

2.91 existing kW 2,909 existing kWh

2.46 new kW 2,338 new kWh

0.30 saved kW 571 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$7.47	$14.95	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	$22.42	
consumption	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	$14.27	
																NPV
subtotal	$21.74	$29.21	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$36.69	$293.78
amoritized	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$34.32	$293.78
blended	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	$23.80	

2.5 ton 487 units at this tonnage

1984 or 1985

3.64 existing kW 3,636 existing kWh

3.08 new kW 2,923 new kWh

0.38 saved kW 713 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$9.34	$18.68	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	$28.03	
consumption	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	$17.83	
																NPV
subtotal	$27.17	$36.52	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$45.86	$367.22
amoritized	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$42.90	$367.22
blended	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	$29.74	

3 ton 19 units at this tonnage

1984 or 1985

4.36 existing kW 4,364 existing kWh

3.69 new kW 3,508 new kWh

0.45 saved kW 856 saved kWh

year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
demand	$11.21	$22.42	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	$33.63	
consumption	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	$21.40	
																NPV
subtotal	$32.61	$43.82	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$55.03	$440.67
amoritized	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$51.48	$440.67
blended	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	$35.69	

Ft. Leonard Wood, MO
Water Conservation Savings

Building Identification and Use Data								
Unit #	Housing Unit Type	1 Bath	1.5 Bath	2 Bath	2.5 Bath	Persons Per Unit	Total Occu-pancy	Days of Operation
1 - 404	2 br	680				NA	1,652	351
405 - 2,038	3 br		1,066			NA	2,590	351
2,039 - 2,240	4 br			559	165	NA	1,760	351
Totals		680	1,066	559	165		6,002	351

Plumbing Fixture Counts						
Water Closets				Aerators		
Wall-mount Flusho-meter Regular Height	Wall-mount Flusho-meter	Wall-mount Flusho-meter Handi-capped Height	Gravity flush	Lavatory	Kitchen Aerators	Shower-head
			0	680	680	680
			0	2,132	1,066	1,066
			0	1,613	724	1,448
Totals	(1 toilets in, 0 out)	0	0	4,425	2,470	3,194

Fixture Use Rates and Savings												
	Existing Fixture Flow Rates				Conservation Fixture Flow Rates				Savings Per Fixture Use			
Housing Type	Water Closets	Kitchen Sinks	Lavatory	Shower-heads	Water Closets	Kitchen Sinks	Lavatory	Shower-heads	Water Closets	Kitchen Sinks	Lavatory	Shower- heads
	(gal/flush)	(gal/min)			(gal/flush)	(gal/min)			(gal/flush)	(gal/min)		
2BR	3.85	2.50	2.50	5.40	1.60	2.00	1.50	2.50	2.25	0.50	1.00	2.90
2BR	3.85	2.50	2.50	5.40	1.60	2.00	1.50	2.50	2.25	0.50	1.00	2.90
4BR	3.85	2.50	2.50	5.40	1.60	2.00	1.50	2.50	2.25	0.50	1.00	2.90

	Utility Savings											
	Daily Water Savings					Annual Water Savings					1368 Unts	1102 Unts
Housing Type	Water Closets	Kitchen Sinks	Lavatory	Shower-heads	Total	Water Closets	Kitchen Sinks	Lavatory	Shower-heads	Total	Electricity Savings Sink and Shower Heating a/	Gas Savings Sink and Shower Heating a/
	(gal/day)					(kgal/yr)					(Kwh/yr)	(Thrm/yr)
2:5.0fpd	0	3,400	6,608	38,326	48,334	0	1,193	2,319	13,453	16,965	131,241	36,060
3:5.0fpd	0	5,330	10,360	60,088	75,778	0	1,871	3,636	21,091	26,598	205,757	56,534
4:5.0fpd	0	3,620	7,040	40,832	51,492	0	1,271	2,471	14,332	18,074	139,815	38,416
	0	12,350	24,008	139,246	175,604	0	4,335	8,427	48,875	61,637	476,813	131,010

Utility Cost Savings				
Housing Type	Water	Waste-water	Heating /b	Total
	($/yr)			
2BR	9,331	10,179	15,570	35,080
2BR	14,629	15,959	24,410	54,998
4BR	9,941	10,844	16,587	37,371
	33,900	36,982	56,566	114,704

Utility Rates		
Water Rates	$0.5500	/kgal
Wastewater Rates	$0.6000	/kgal
Electric Rates	$0.0417	/Kwh
Natural Gas Rates	$0.2800	/therm

a/ 1,368 homes by electricity; 1102 by gas

A 90% safety factor is used to account for the occupants that do not use the low flow fixtures.

Appendix F

Make	Model	Capacity (T)	Quantity	Empty	Previously Replaced Units	Present Retrofit Total	Total Tons This Retrofit
Group 1	**1985**		**335**			**61**	**161**
?	?	3	3	0	0	3	9
ArcoAire	1985	3	72	53	5	14	42
ArcoAire	1985	2.5	260	209	7	44	110
Group 2	**1984**		**729**			**692**	**1607.5**
Ruud	1984	3	2	0	0	2	6
Ruud	1984	2.5	465	0	22	443	1107.5
Ruud	1984	2	262	0	15	247	494
Group 3			**257**			**239**	**562.5**
Trane	1980	2.5	183	0	14	169	422.5
Trane	1980	2	74	0	4	70	140
Group 4			**379**			**348**	**851**
Ruud/Singer	1979	2.5	339	0	29	310	775
Ruud	1979	2	40	0	2	38	76
Group 5			**584**			**454**	**1167**
Ruud	1978	4	13	0	2	11	44
Ruud	1978	3	48	0	17	31	93
Ruud	1978	2.5	523	0	111	412	1030
Group 6			**306**			**215**	**580.5**
Singer	1976	3	170	4	51	115	345
Singer	1976	2.5	98	1	26	71	177.5
Singer	1976	2	38	6	3	29	58
Group 7			**233**			**212**	**636**
Mac Aire	1975	3	1	0	1	0	0
York/Ruud	1975	3	232	10	10	212	636
Grand Total			***2823***			***2221***	***5565.5***

Calculation of Before Case Sample Size Ft. Leonard Wood ACCU Project

Global Inputs

Required Precision in %, (%P)	0.100
Critical t-value for 90% Confidence, (t_{crit})	1.645

Usage Group	Number of ACCU's N_k	Average Change in Wattage (kW)	Total Change in Wattage (kW)	Projected Average Hours of Operation	Expected Savings (ES) [kWh/year]	Coefficient of Variation (cv)	ES*cv	Sum $((ES*cv)^2/N_k)$	n_k/n	n_k	n_k (rounded)
Group 1	61	1.95	119	950	112724.15	0.5	56,362	5.21E+07	0.03	1.90	**2**
Group 2	692	1.71	1,185	950	1125491.13	0.5	562,746	4.58E+08	0.29	18.96	**19**
Group 3	239	1.73	415	950	393834.375	0.5	196,917	1.62E+08	0.10	6.63	**7**
Group 4	348	1.80	627	950	595827.65	0.5	297,914	2.55E+08	0.15	10.04	**11**
Group 5	454	1.89	860	950	817075.05	0.5	408,538	3.68E+08	0.21	13.76	**14**
Group 6	215	1.99	428	950	406437.075	0.5	203,219	1.92E+08	0.10	6.85	**7**
Group 7	212	2.21	469	950	445295.4	0.5	222,648	2.34E+08	0.11	7.50	**8**

Final, Total Sample Size (n)	**68**

Intermediate Calcs

	x	x^2
$Sum(ES)_k$	3,896,685	
$Sum(ES*cv)_k$	1,948,342	3.80E+12
$Sum((ES*cv)^2/N)_k$	1.72E+09	
$\%P*Sum(ES)_k/t_{crit}$	236,881	5.61E+10

Initial Sample Size (n)	65.64

Check ....

Standard Error	232,725
$\%P*ES/t_{crit}$	236,881
Ratio(should be < or =1)	0.982

Calculation of After Case Sample Size Ft. Leonard Wood ACCU Project

Global Inputs

Required Precision in %, (%P)	0.100
Critical t-value for 90% Confidence, (t_{crit})	1.645

Usage Group	Number of ACCU's N_k	Average Change in Wattage (kW)	Total Change in Wattage (kW)	Projected Average Hours of Operation	Expected Savings (ES) [kWh/year]	Coefficient of Variation of Efficiency (cv)	ES*cv	Sum $((ES*cv)^2/N_k)$	n_k/n	n_k	n_k (rounded)
Population	2221	1.85	4,102	950	3896900	0.315	1,227,524	6.78E+08	1.00	26.53	27

Final, Total Sample Size (n)	27

Intermediate Calcs

	x	x^2
$Sum(ES)_k$	3,896,900	
$Sum(ES*cv)_k$	1,227,524	1.51E+12
$Sum((ES*cv)^2/N)_k$	6.78E+08	
$\%P*Sum(ES)_k/t_{crit}$	236,894	5.61E+10

Initial Sample Size (n)	26.53

Check ....

Standard Error	234,797
$\%P*ES/t_{crit}$	236,894
Ratio(should be < or =1)	0.991

Appendix G

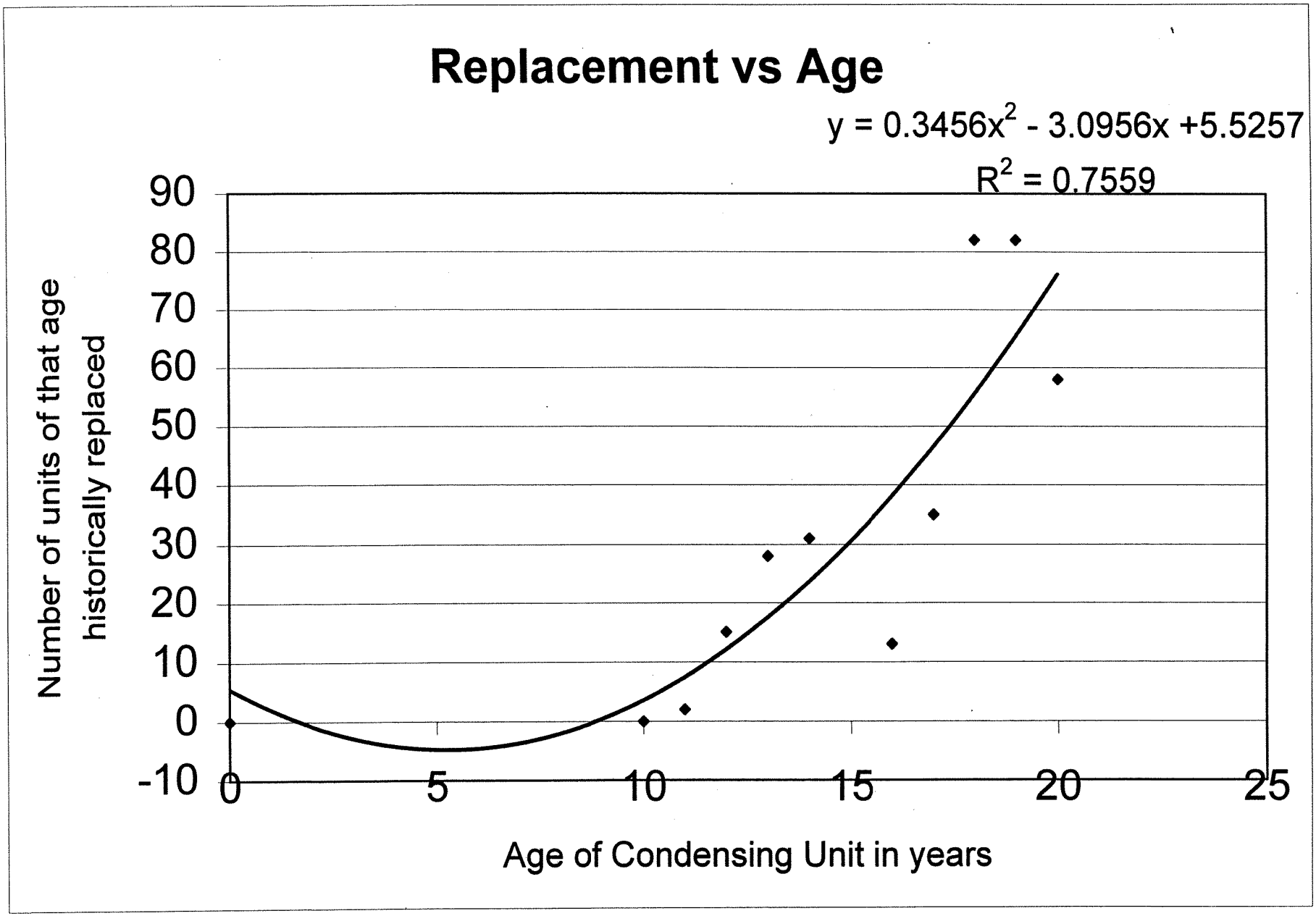
Narrative to Appendix G

The following graph, data table and spreadsheet are provided to show the O&M savings that will result from the replacement of the 2,221 condensing units and evaporator coils.

Currently Fort Leonard Wood has a contract with D&D Heating and Cooling Inc. (here after referred to as D&D) to repair and maintain all condensing units, evaporator coils and furnaces on an as needed basis. In accordance with the contract D&D picks up service orders twice daily from the service order desk, which is where all family housing occupant complaints and/or requests are called in. For each service call made D&D receives $21.20 for routine service calls and $78.36 for emergency service calls plus the cost of all parts and labor necessary to repair the reported problem. The definition of an emergency service call is found in section C.1.7.3 of the contract, and is stated as follows: "Emergency service calls shall be classified as all calls received other than normal working hours". For each repair made D&D must charge only the direct cost of materials and the labor costs for each type of repair as defined in the contract. For example, the labor charge for a condensing unit replacement is $46.68 and for an evaporator coil replacement it is $51.92.

As a result of this project's 2,221 condensing unit and evaporator coil replacements the post will realize a reduction in costs from D&D. In order to estimate the future cost of the existing units, historical data (included in the data table) was plotted and a best-fit curve was applied to the data. The graph predicted that all 2,221 of the existing units would be replaced over the next fifteen years, which is reasonable since the units being replaced are all 1985 and older. The same graph also predicted that 145 of the new units would need to be replaced during the next fifteen years, which is reasonable since the units will still be within their median life. The same methodology was used for evaporator coil replacements to predict that 458 existing coils and 134 new coils would be replaced. The number of existing coils to be replaced appears extremely conservative based on their age, but since the post does not make a practice of replacing the coils the number is reasonable and in fact weighs in the post's favor. The service call cost and miscellaneous cost were also determined from historical data. The service calls apply to all repairs including replacements, while the miscellaneous calls only apply to existing units, which have not yet been replaced.

Since the post is going to continue to use D&D as the maintenance subcontractor of the new units the calculations show a credit to Fort Leonard, these are the negative numbers that appear in columns 5, 9 and 13. The final analysis yields the difference in the cost to maintain the existing units and the cost to maintain the new units. The annual savings were amortized into a level annual payment since the payment of the loan is also a fixed annual amount.


Replacement vs Age
y = 0.3456x2 - 3.0956x +5.5257
R2 = 0.7559
Number of units of that age historically replaced
90
80
70
60
50
40
30
20
10
0
-10
0
5
10
15
20
25
Age of Condensing Unit in years

Age	replaced	Equation
0	0	
1		3
2		1
3		-1
4		-1
5		-1
6		-1
7		1
8		3
9		6
10	0	9
11	2	13
12	15	18
13	28	24
14	31	30
15		37
16	13	44
17	35	53
18	82	62
19	82	71
20	58	82
21		93
22		105
23		117
24		130
25		144
26		159
27		174
28		190
29		206
30		224

O&M Savings

Project Term:	15
O&M Inflation Factor:	2.40%
Finance Discount Factor	7.75%
Average ACCU cost	$513.19
Average evaporator cost	$196.23
Average service call	$33.78
Percent service calls	35%
Miscellaneous cost	$15.00
Percent miscellaneous	25%

Annual O&M savings $116,295

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Year	Number of FLW ACCU replacements	Cost of FLW ACCU replacements	Number of CES ACCU replacements	Cost of CES ACCU replacements	Number of FLW coil replacements	Cost of FLW coil replacements	Number of CES coil replacements	Cost of CES coil replacements	Number of FLW service calls	Cost of FLW service calls	Number of CES service calls	Cost of CES service calls	Number of FLW miscellaneous	Cost of FLW miscellaneous	Annual O&M Total	Amortized O&M Savings	Project O&M Savings
1	112	$58,857	5	-$2,628	18	$3,617	1	-$201	868	$30,025	6	-$208	527	$8,095	$97,557	$116,295	$116,295
2	128	$68,879	2	-$1,076	20	$4,115	2	-$412	841	$29,789	4	-$142	495	$7,786	$108,940	$116,295	$116,295
3	144	$79,349	0	$0	21	$4,425	3	-$632	808	$29,307	3	-$109	459	$7,393	$119,732	$116,295	$116,295
4	162	$91,410	0	$0	23	$4,962	4	-$863	771	$28,636	4	-$149	419	$6,910	$130,907	$116,295	$116,295
5	180	$104,004	0	$0	25	$5,523	5	-$1,105	728	$27,688	5	-$190	374	$6,316	$142,237	$116,295	$116,295
6	201	$118,925	0	$0	27	$6,108	6	-$1,357	681	$26,522	6	-$234	324	$5,603	$155,568	$116,295	$116,295
7	222	$134,503	2	-$1,212	28	$6,487	7	-$1,622	625	$24,925	9	-$359	268	$4,746	$167,468	$116,295	$116,295
8	244	$151,380	5	-$3,102	30	$7,117	9	-$2,135	564	$23,032	14	-$572	207	$3,754	$179,474	$116,295	$116,295
9	266	$168,989	9	-$5,718	32	$7,773	10	-$2,429	495	$20,700	19	-$795	141	$2,618	$191,139	$116,295	$116,295
10	217	$141,168	14	-$9,108	34	$8,458	11	-$2,736	372	$15,930	25	-$1,071	86	$1,635	$154,276	$116,295	$116,295
11	74	$49,296	20	-$13,323	36	$9,170	12	-$3,057	205	$8,989	32	-$1,403	68	$1,324	$50,996	$116,295	$116,295
12	82	$55,936	27	-$18,418	38	$9,912	14	-$3,652	186	$8,352	41	-$1,841	47	$937	$51,226	$116,295	$116,295
13	89	$62,168	36	-$25,147	40	$10,684	15	-$4,006	164	$7,541	51	-$2,345	25	$510	$49,405	$116,295	$116,295
14	97	$69,382	45	-$32,188	42	$11,487	17	-$4,650	140	$6,592	62	-$2,919	1	$21	$47,726	$116,295	$116,295
15	3	$2,197	56	-$41,017	44	$12,323	18	-$5,041		$0	74	-$3,568		$0	-$35,106	$116,295	$116,295
Total	2,221		145		458		134							NPV	$1,010,799	$1,010,799	

Notes:

1 *Contract year*
2 *Number of existing ACCUs to be replaced in the given year*
3 *Cost to replace the ACCUs at a present cost of $513.19 per unit and 2.40% per year inflation*
4 *Number of new ACCUs to be replaced in the given year*
5 *Cost to replace the ACCUs at a present cost of $513.19 per unit and 2.40% per year inflation*
6 *Number of existing evaporator coils to be replaced in the given year*
7 *Cost to replace the evaporator coils at a present cost of $196.23 per coil and 2.40% per year inflation*
8 *Number of new evaporator coils to be replaced in the given year*
9 *Cost to replace the evaporator coils at a present cost of $196.23 per coil and 2.40% per year inflation*
10 *Number of service calls on existing equipment in the given year*
11 *Cost of service calls at a present cost of $33.78 per coil and 2.40% per year inflation*
12 *Number of service calls on new equipment in the given year*
13 *Cost of service calls at a present cost of $33.78 per coil and 2.40% per year inflation*
14 *Number of miscellaneous parts on existing equipment in the given year*
15 *Cost of miscellaneous parts at a present cost of $15.00 per coil and 2.40% per year inflation*
16 *Annual cost for maintenance for each given year (sum of columns 3, 5, 7, 9, 11, 13 and 15)*
17 *Amortized cost of the NPV of column 16*
18 *Annual O&M savings*

Appendix H

****
* N I S T B L C C: COMPARATIVE ECONOMIC ANALYSIS (ver. 4.61-98) *
****

Project: Fort Leonard Wood (Improvements in FH)
Base Case: Base Case
Alternative: After Case

Principal Study Parameters:

Analysis Type: Federal Analysis--Energy Conservation Projects
Study Period: 15.00 Years (JUL 1999 through JUN 2014)
Discount Rate: 4.3% Real (exclusive of general inflation)
Base Case LCC File: FLWBASE2.LCC
Alternative LCC File: FLWAFT2.LCC

Comparison of Present-Value Costs

	Base Case: Base Case	Alternative: After Case	Savings from Alt.
Initial Investment item(s):			
Capital Requirements as of Serv. Date	$0	$3,267,235	-$3,267,235
Subtotal	$0	$3,267,235	-$3,267,235
Future Cost Items:			
Annual and Non-An. Recurring Costs	$1,293,245	$0	$1,293,245
Energy-related Costs	$8,293,321	$5,036,475	$3,256,846
Subtotal	$9,586,566	$5,036,475	$4,550,091
Total P.V. Life-Cycle Cost	$9,586,566	$8,303,710	$1,282,856

Net Savings from Alternative 'After Case' compared to Base Case 'Base Case'

Net Savings	=	P.V. of Non-Investment Savings	$4,550,091
	-	Increased Total Investment	$3,267,235
		Net savings:	$1,282,856

Note: the SIR and AIRR computations include differential initial costs, capital replacement costs, and residual value (if any) as investment costs, per NIST Handbook 135 (Federal and MILCON analyses only).

Savings-to-Investment Ratio (SIR)
For Alternative 'After Case' compared to Base Case 'Base Case'

$$SIR = \frac{\text{P.V. of non-investment savings}}{\text{Increased total investment}} = 1.39$$

Adjusted Internal Rate of Return (AIRR)
For Alternative 'After Case' compared to Base Case 'Base Case'
(Reinvestment Rate = 4.30%; Study Period = 15 years)

AIRR = 6.63%

Estimated Years to Payback

Simple Payback occurs in year 8
Discounted Payback occurs in year 10

ENERGY SAVINGS SUMMARY

Energy type	Units	Average Annual Consumption - Base Case	Average Annual Consumption - Alternative	Average Annual Consumption - Savings	Life-Cycle Savings
Electricity	kWh	10,163,680.0	6,689,167.0	3,474,513.0	%52,117,696
0					
Natural Gas	Therm	131,010.0	0.0	131,010.0	1,965,150.0
Other	Gallon	133,751.0	72,114.0	61,637.0	924,555.0

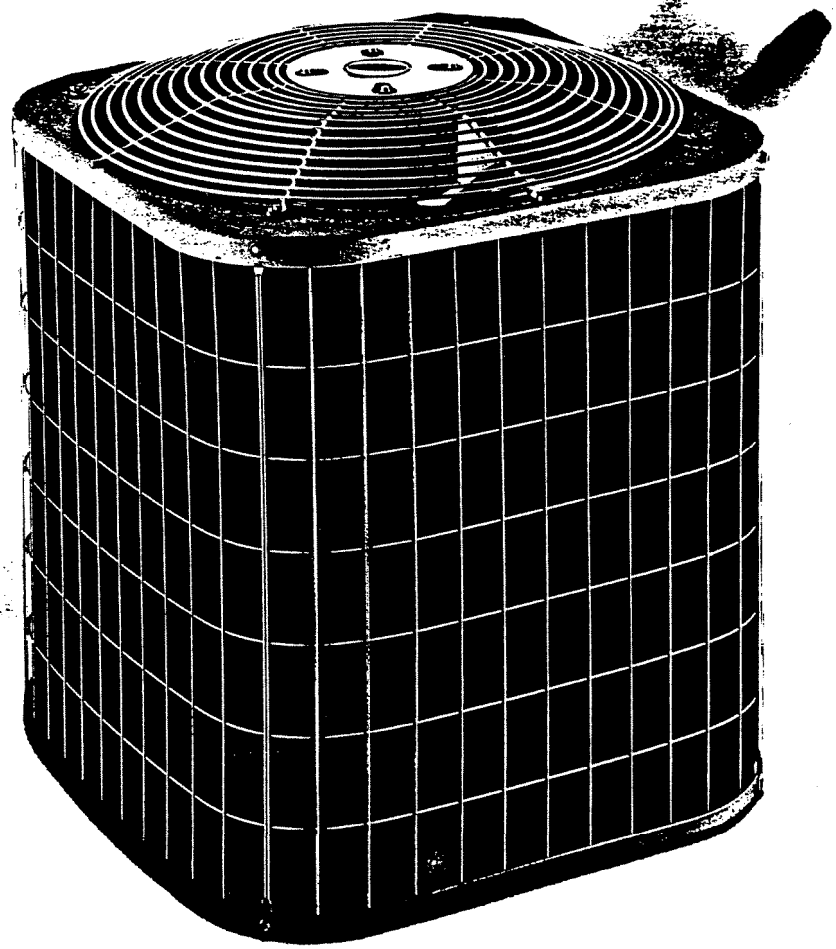
EMISSIONS REDUCTION SUMMARY

Energy type	Average Annual Emissions - Base Case	Average Annual Emissions - Alternative	Average Annual Emissions - Reduction	Life-Cycle Reduction
Electricity:				
CO2 (Mg):	9,852.2	6,484.2	3,368.0	50,520.6
SO2 (Kg):	32,985.3	21,709.1	11,276.2	169,143.3
NOx (Kg):	29,679.3	19,533.3	10,146.0	152,190.6
Natural Gas:				
CO2 (Mg):	691.9	0.0	691.9	10,378.6
SO2 (Kg):	2.8	0.0	2.8	41.3
NOx (Kg):	539.1	0.0	539.1	8,086.6
Other:				
CO2 (Kg):	0.0	0.0	0.0	0.0
SO2 (Kg):	0.0	0.0	0.0	0.0
NOx (Kg):	0.0	0.0	0.0	0.0
Total:				
CO2 (Mg):	10,544.1	6,484.2	4,059.9	60,899.2
SO2 (Kg):	32,988.1	21,709.1	11,279.0	169,184.5
NOx (Kg):	30,218.4	19,533.3	10,685.1	160,277.2

Carrier®

WEATHERMATE® – 38CKC & 38CKQ

Central Air Conditioning

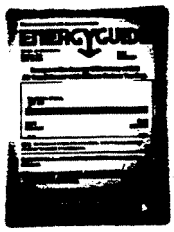


EFFICIENT PERFORMANCE AT 10.0 SEER

Carrier's 38CKC and 38CKQ air conditioners deliver cool economy.

comfortable savings

Carrier delivers cool comfort, economical initial cost and money-saving efficiency with the WeatherMate line of central air conditioners. With Carrier's 38CKC and 38CKQ air conditioners, you can enjoy your indoor weather while conserving energy at up to 11.5 SEER (Seasonal Energy Efficiency Ratio). These air conditioners can reduce your cooling costs when replacing a typical, older model. And, you'll continue to save year after year because Carrier products are designed and built for lasting value.



Carrier's innovative technology helps the 38CKC and 38CKQ maximize your comfort and energy efficiency. The unique, aerodynamic design of the top provides added stability for the unit while enhancing the airflow for quieter, more efficient operation. Inside, the air conditioner's most important single component, the compressor, is designed for long-term reliability with built-in protection from potentially damaging conditions. And, you can expect a lifetime of corrosion-resistant good looks because the compact cabinet is coated with our patented Weather Armor finish.

dependable

The 38CKC and 38CKQ deliver **indoor weather you can count on because it has survived Carrier's intense quality and reliability testing.** From first design through completed product, we check and re-check our products for quality and reliability. By the time your Carrier dealer, the indoor weather expert, has installed this air conditioner at your home, we are confident that it will pass the toughest test of all: your satisfaction. If you are replacing your outdoor unit, Carrier recommends the replacement of the indoor section as well to ensure peak performance and reliability. This commitment to delivering the finest quality indoor weather products has helped Carrier become the nation's leading name in air conditioning.

proven technology

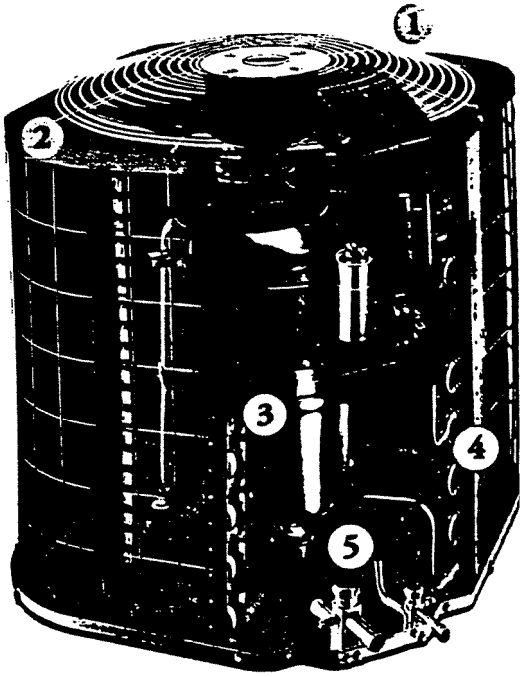
1. **Quiet, efficient operation** is enhanced with Carrier's Aerodynamic Top. This exclusive design allows air to flow through the unit with less turbulence for improved performance and more consistent indoor weather.

2. **Long-lasting good looks** of Carrier's Weather Armor™ cabinet keeps your outdoor unit looking clean and new. It's made of galvanized steel and finished with a baked-on powder coating for corrosion and scratch-resistance.

3. **Added efficiency and durability** of the compressor is the result of smoother, more consistent operation. The compressor is the single most important component in an air conditioning system.

4. **Efficient heat transfer** of the Copper Tube/Aluminum Fin Coil provides optimum cooling in a compact cabinet and long-lasting corrosion resistance for added reliability.

5. **Durable performance** is strengthened by the corrosion-resistant base pan which is designed for superior drainage of water and small debris.

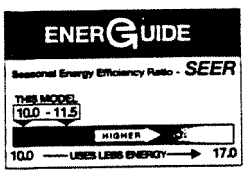


WARRANTY

As the industry's quality leader, Carrier backs its products in writing. The compressor is covered with a five-year limited warranty. The entire unit is protected by a one-year limited warranty. Ask your indoor weather expert about extended warranty programs.

Carrier

Carrier®
CUSTOM MADE INDOOR WEATHER™



Visit our web site at www.carrier.com.

Always look for these symbols. the air conditioning industry seals of certified performance, efficiency and capacity

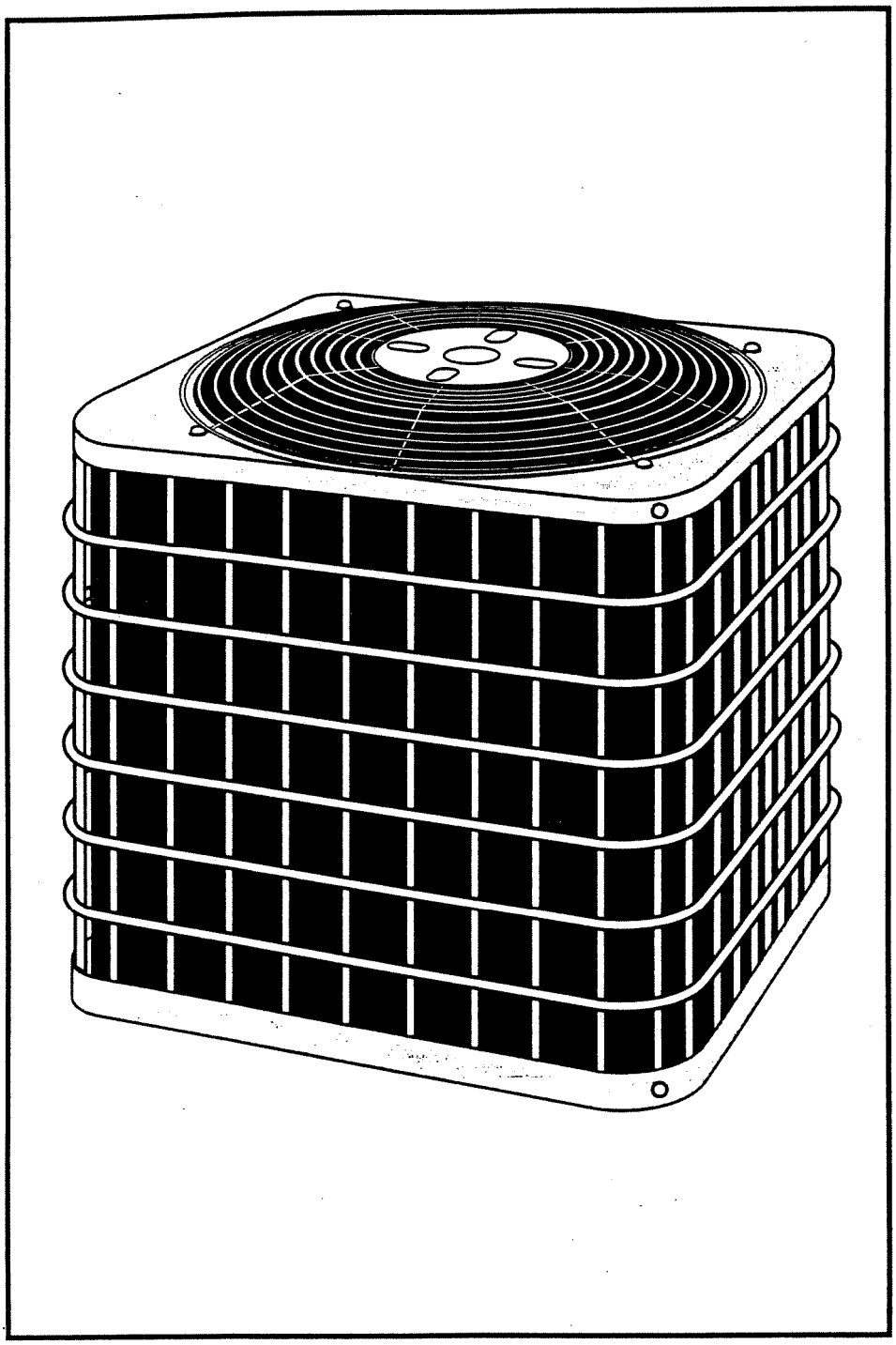
838-806

Carrier®
HEATING & COOLING

Product Data

38CKC
38CKQ
60 Hz Air Conditioner

38CKC Sizes 018 thru 060
38CKQ Sizes 024 thru 048



Model 38CKC(Q) Energy-Efficient Air Conditioner incorporates innovative technology to provide reliable summer cooling performance. Built into these units are the features most desired by homeowners today, including SEER ratings of up to 11.5 when used with components designated by manufacturer. The 38CKQ is specifically constructed for manufactured housing, and is listed with RADCO. All models are listed with UL, c-UL, ARI, CEC, and CSA-EEV.

FEATURES/BENEFITS

Electrical Range — All units are offered in 208–230v single phase. Three-phase units are available from 030 through 060 sizes in 208/230v and from 036 through 060 sizes in 460v.

Wide Range of Sizes — The 38CKC is available in 7 nominal sizes from 018 through 060 to meet the needs of residential and light commercial applications. The 38CKQ is available in 5 nominal sizes from 024 through 048 to meet the needs of the manufactured housing market.

Weather Armor II Cabinet — The steel is protected with a galvanize coating and treated with a layer of zinc phosphate. A modified polyester powder coating is then applied and baked on, providing each unit with a hard, smooth finish that will last for many years.

All screws on cabinet exterior are coated for a long-lasting, rust-resistant quality appearance.

Totally Enclosed Fan Motor — Provides greater reliability under adverse conditions and dependable

performance for many years. The permanent-split-capacitor-type motor was designed for optimum efficiency. The motor was then qualified under extreme conditions to help ensure a long, reliable life.

Unit Design — Copper tube, enhanced sine wave aluminum fin coil is designed for optimum heat transfer. Vertical air discharge carries sound and hot condenser air up and away from adjacent patio areas and foliage. Heat pump style drain pan allows for easy removal of water, dirt, and leaves.

Application Versatility — The unit can be combined with a wide variety of evaporator coils and blower packages to provide quiet, dependable comfort. Unit can be installed on a roof or at ground level.

External Service Valves — Both service valves are brass, front seating type. The 38CKC has sweat field connections. The 38CKQ has mechanical field connections. Valves are externally located so refrigerant tube connections can be made quickly and easily. Each valve has a service port for ease of checking operating refrigerant pressures.

Easy Serviceability — One access panel provides access to electrical control box. Removal of top allows access to fan motor and coil.

Compressor Protection — Each compressor is protected with internal temperature- and current-sensitive overloads.

Limited Warranty — Standard 1-year warranty on parts, with an additional 4-year warranty on compressor.

CERTIFICATION APPLIES ONLY WHEN THE COMPLETE SYSTEM IS LISTED WITH ARI.

APPROVALS
ISO 9001
EN 29001
BS 5750 PART 1.
ANSI/ASQC Q91

CERTIFICATE NO. FM 28768

REGISTERED QUALITY SYSTEM

Model number nomenclature

38CKC(Q) — 018 — 3 — 0 — 1

- 38CKC(Q): Electric Air Conditioner
- 018: Nominal Capacity
  - 018 — 18,000 Btuh
  - 024 — 24,000 Btuh
  - 030 — 30,000 Btuh
  - 036 — 36,000 Btuh
  - 042 — 42,000 Btuh
  - 048 — 48,000 Btuh
  - 060 — 60,000 Btuh
- 3: Electrical
  - 3 — 208-230-1
  - 5 — 208/230-3
  - 6 — 460-3
- 0: Series
- 1: Packaging

The data in this publication is displayed for all series; however, every series may not be available from manufacturer.

Electrical data

UNIT SIZE	V/PH	OPER VOLTS*		COMPRESSOR		FAN FLA	MCA	60°C MIN WIRE SIZE†	75°C MIN WIRE SIZE†	60°C MAX LENGTH (Ft)‡	75°C MAX LENGTH (Ft)‡	MAX FUSE** OR CKT BKR AMPS
		Max	Min	LRA	RLA							
018-30	208–230-1	253	197	49.0	9.6	0.8	12.8	14	14	61	58	20
018-33				48.0	9.0	0.8	12.1	14	14	65	61	15
024-30				56.0	10.7	1.0	14.4	14	14	50	50	20
024-33				60.0	11.6	1.0	15.5	14	14	49	47	20
030-30				75.0	14.2	0.8	18.6	14	14	40	40	25
030-33				73.0	14.8	0.8	19.3	14	14	40	38	25
036-30				95.0	16.7	1.4	22.3	12	12	55	50	30
036-31				86.0	14.8	1.4	19.9	12	12	55	55	30
036-34				82.0	16.0	1.4	21.4	12	12	58	55	30
042-30				115.0	20.5	1.4	27.0	10	10	70	70	40
042-31				102.0	19.7	1.4	26.0	10	10	75	70	40
048-30				140.0	24.4	1.4	31.9	8	10	95	55	50
048-31				129.0	23.7	1.4	31.0	8	10	100	60	50
060-30				165.0	28.9	1.4	37.5	8	8	80	75	60
060-31				169.0	28.8	1.4	37.4	8	8	80	75	60
030-50	208/230-3	253	187	68.0	9.4	0.8	12.6	14	14	70	65	15
036-51				70.0	10.0	1.4	13.9	14	14	65	62	20
036-53				75.0	10.6	1.4	14.7	14	14	60	55	20
042-52				90.0	12.4	1.4	16.9	14	14	50	50	25
042-51				91.0	13.6	1.4	18.4	14	14	45	45	25
048-51				120.0	13.5	1.4	18.3	14	14	45	45	25
048-52				105.0	14.1	1.4	19.0	14	14	48	46	25
060-51				137.0	18.3	1.4	24.3	12	12	58	55	35
060-52				125.0	16.0	1.4	21.4	12	12	68	65	30
036-61	460-3	506	414	33.0	5.1	0.8	7.2	14	14	250	238	15
042-61				42.0	6.2	0.8	8.6	14	14	210	200	15
048-61				49.5	7.4	0.8	10.1	14	14	185	175	15
048-62				52.5	7.1	0.8	9.7	14	14	182	173	15
060-61				62.0	9.0	0.8	12.1	14	14	150	142	15
060-62				66.5	8.0	0.8	10.8	14	14	165	157	15

* Permissible limits of the voltage range at which unit will operate satisfactorily. Operation outside these limits may result in unit failure.

† If wire is applied at ambient greater than 30°C (86°F), consult Table 310-16 of the NEC (ANSI/NFPA 70). The ampacity of nonmetallic-sheathed cable (NM), trade name ROMEX, shall be that of 60°C (140°F) conductors, per the NEC (ANSI/NFPA 70) Article 336-30. If other than uncoated (non-plated), 60 or 75°C (140 or 167°F) insulation, copper wire (solid wire for 10 AWG and smaller, stranded wire for larger than 10 AWG) is used, consult applicable tables of the NEC (ANSI/NFPA 70).

‡ Length shown is as measured 1 way along wire path between the unit and service panel for a voltage drop not to exceed 2%.

** Time-delay fuse.

FLA — Full Load Amps
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
RLA — Rated Load Amps

NOTES: 1. Control circuit is 24v on all units and requires external power source.
2. Copper wire must be used from service disconnect to unit.
3. All motors/compressors contain internal overload protection.

Visit www.carrier.com

Installation and Start-Up Instructions

NOTE: Read the entire instruction manual before starting the installation.

This symbol → indicates a change since the last issue.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit. Consult local building codes and National Electrical Code (NEC) for special requirements.

Recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage.

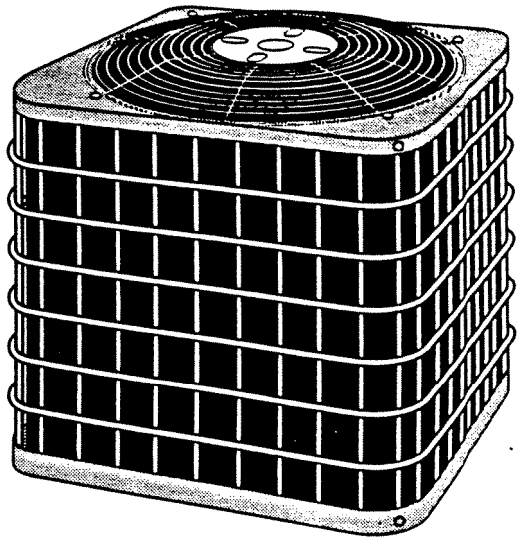
⚠ WARNING

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label. Electrical shock can cause personal injury or death.

INSTALLATION RECOMMENDATIONS

NOTE: In some cases noise in the living area has been traced to gas pulsations from improper installation of equipment.

1. Locate unit away from windows, patios, decks, etc. where unit operation sound may disturb customer.
2. Ensure that vapor and liquid tube diameters are appropriate to capacity of unit.
3. Run refrigerant tubes as directly as possible by avoiding unnecessary turns and bends.
4. Leave some slack between structure and unit to absorb vibration.
5. When passing refrigerant tubes through the wall, seal opening with RTV or other pliable silicon-based caulk. (See Fig. 2.)
6. Avoid direct tubing contact with water pipes, duct work, floor joists, wall studs, floors, and walls.



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→ **Fig. 1—Model 38CKC**

7. Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap which comes in direct contact with tubing. (See Fig. 2.)
8. Ensure that tubing insulation is pliable and completely surrounds vapor tube.

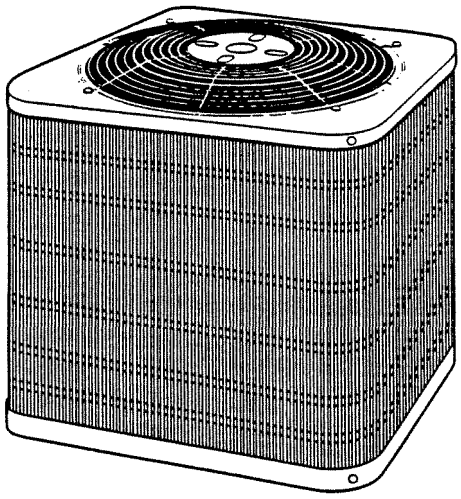

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Fig. 1A—Models 38CKG, 38CKS, 38CKW

9. When necessary, use hanger straps which are 1 in. wide and conform to shape of tubing insulation. (See Fig. 2.)
10. Isolate hanger straps from insulation by using metal sleeve bent to conform to shape of insulation.

Appendix I

GE Capital
Vendor Financial Services

Potomac Federal
General Electric Company
2000 Corporate Ridge, Ste. 1095, McLean, VA 22102
*703 749-3520, DC. 8*521-2007, Fax: 703 749-3527*

May 11, 1999

Mr. Erbin Keith
CES/WAY International
2500 Citywest Boulevard
Suite 1800
Houston, Texas 77042

Re: Intent to provide financing for Ft. Leonard Wood ESPC Projects

To Whom It May Concern:

GE Capital – Potomac Federal ("GE Capital") has been working with CES/WAY in providing financial services for Federal Government opportunities. This letter confirms our intent to finance all equipment and/or services related to a delivery or task orders awarded to CES/WAY by Ft. Leonard Wood. GE Capital possesses a very unique and specialized expertise in the area of Government contracting and finance which has proven valuable to numerous corporations involved in energy projects as well as other markets within the Government requiring the financing of equipment and services.

We service our clients through a staff of highly skilled and experienced professionals having expertise in the areas of Government contracting, law, finance, marketing and administration. It is this commitment to the Government market that has gained GE Capital the reputation as the foremost authority in this business.

For the past seven, GE Capital has worked closely with the Department of Energy, the Department of Defense, the United States Postal Service and the Veterans Administration in developing a contractual framework which complements the financial services which we offer to our clients participating in energy projects. GE Capital has a Program Agreement in place with CES/WAY to provide the financing for energy services projects in the Government as well as the Commercial and Industrial markets. We are prepared to finance projects up to $15 million under our Agreement.

We look forward to continuing the long term, mutually beneficial relationship with CES/WAY.

Sincerely,

Bruce W. Gross
Vice President

BWG/sss

Appendix J

Sempra Energy Solutions

Fort Leonard Wood SCOPE: Complete scope

Tax Exempt Guaranteed Savings

Performance Engineering Project

Total Construction Cost	$ 3,266,409	
Performance Bond (if required)	$49,697	
Finance Fees to Lessor (Legal, insurance, placement, closing, etc.)	$0	
Construction Interest (Capitalized)	$69,420	*note a*
Total Construction amount including incidental expenses	$3,385,526	
TOTAL AMOUNT FINANCED	**$3,385,526**	

Projected Savings				Payments by Fort Leonard Wood							
						Sempra Energy Solutions				Projected Net Cash Flow to Fort Leonard Wood	
Year	Energy	Maintenance	**Total**	Total Lease Payments	Customer Contribution Funding	Net Lease Payment	Performance Phase Compensation	M&V Costs	Total Net Payments	$	%
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
0	$52,744	$0	$52,744	$0	$0	$0	$0	$0	$0	$52,744	*note b*
1	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
2	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
3	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
4	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
5	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
6	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
7	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
8	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
9	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
10	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
11	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
12	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
13	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
14	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
15	$293,023	$116,622	$409,645	$391,961	$0	$391,961	$0	$16,158	$408,119	$1,526	0%
Total	$ 4,395,340	$ 1,749,336	$ 6,144,676	$5,879,414	$0	$5,879,414	$0	$242,370	$6,121,784	$22,892	0%
PV@8%	$2,599,610	$1,013,647	$3,613,257	$3,406,808	$0	$3,406,808	$0	$140,441	$3,547,249	$66,009	

Notes:

a The construction interest is estimated by taking the sum of half the total construction cost and the performance bond cost multiplied over half of the construction period at an 8.25% interest rate.

b The energy savings in year zero is estimated to be 18% of the first year savings (note: all savings in year zero will be retained by Fort Leonard Wood).

1 The projections reflect the economic benefits over a 15 year term and during the construction period (yr. 0)

2 Assumes an annual increase in energy costs per year of 0.0%.

3 Based on an estimate. Assumes a 0.0 % annual increase for inflation.

4 Sum of Energy and Maintenance savings.

5 Paid monthly after Commencement Date (construction completion) of project based on $3385526 financed at 8.2% over 15 years.

6 Reimbursement to Fort Leonard Wood from Customer Contribution %:.

7 Net lease payment is guaranteed by CES/Way International Inc. to be less than total savings.

8 Represents CES/Way's Contingent Service Fee for its contractual services, monitoring responsibilities and risk, at the greater of 20% of savings less Lease payment, or $0 adjusted for CPI, assuming 0.0% escalation per year.

9 Represents projected M&V payments to be made by Fort Leonard Wood

10 Represents total projected payments to be made by Fort Leonard Wood

11 Represents net cash flow to the Fort Leonard Wood

Fort Leonard Wood

Energy Conservation Project Summary

ECM #	ECM DESCRIPTION	TOTAL ECM COST	DIRECT ECM COST	UTILITY INCENTIVE	NET ECM COST	ANNUAL SAVINGS	Ann Energy Savings	Ann. Maint. Savings	PAYBACK w/o Aid	PAYBACK w/ Aid
	Lighting	$ -	$ -	$ -	$ -	$ -	$ 33,284	$ 2,987	n/a	n/a
	Condensing Unit Replacements	$ 2,913,009	$ 1,929,559	$ -	$ 2,913,009	$ 294,941	$ 178,319	$ 116,622	9.9	9.9
	Water Conservation	$ 353,400	$ 234,090	$ -	$ 353,400	$ 114,704	$ 114,704	$ -	3.1	3.1
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -	$ -	$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
		$ -		$ -	$ -	$ -			n/a	n/a
	TOTAL PROJECT	**$ 3,266,409**	**$ 2,163,649**	**$ -**	**$ 3,266,409**	**$ 409,645**	**$ 293,023**	**$116,622**	**7.97**	**7.97**

Fort Leonard Wood

PROJECT: Fort Leonard Wood
ECM: All Measures

ESTIMATED BY Petrosky
PRINT DATE 7/28/99
REV. DATE 8/12/98
REV #:

COST CODE	ITEM DESCRIPTION	CES/WAY PURCHASED EQUIP.	SUBCONT. PURCHASED EQUIP.	SUBCONT. PROVIDED LABOR	SUBCONT. TOTAL LAB & MATLS
1701	CHILLERS	$ -	$ -	$ -	$ -
1702	AIRHANDLERS	$ -	$ -	$ -	$ -
1703	FAN & COIL UNITS	$ -	$ -	$ -	$ -
1704	COOLING COILS	$ 179,838	$ -	$ 114,104	$ 114,104
1705	HEATING COILS	$ -	$ -	$ -	$ -
1706	ROOF TOP UNITS	$ -	$ -	$ -	$ -
1707	CONDENSING UNITS	$ -	$ -	$ -	$ -
1708	AIR COOLED CONDENSERS	$ 722,036	$ -	$ 114,104	$ 114,104
1709	PACKAGED COOLING TOWERS	$ -	$ -	$ -	$ -
1710	BOILERS	$ -	$ -	$ -	$ -
1711	PUMPS	$ -	$ -	$ -	$ -
1712	ELECTRIC STRIP HEATERS	$ -	$ -	$ -	$ -
1713	UNIT HEATERS	$ -	$ -	$ -	$ -
1714	UNIT VENTILATORS	$ -	$ -	$ -	$ -
1715	FANS	$ -	$ -	$ -	$ -
1716	RELIEF VENTS & INTAKES	$ -	$ -	$ -	$ -
1717	BOILER BREECHING/FLUES	$ -	$ -	$ -	$ -
1718	GRILLES & DIFFUSERS	$ -	$ -	$ -	$ -
1719	MIXING & VAV BOXES	$ -	$ -	$ -	$ -
1720	SOUND ATTENUATORS	$ -	$ -	$ -	$ -
1721	LOUVERS	$ -	$ -	$ -	$ -
1722	FIRE DAMPERS	$ -	$ -	$ -	$ -
1723	FILTERS	$ -	$ -	$ -	$ -
1724	DRAFT GAUGES	$ -	$ -	$ -	$ -
1725	CONDENSATE RETURN UNITS	$ -	$ -	$ -	$ -
1726	HW/DHW CONVERTERS	$ -	$ -	$ -	$ -
1727	STEAM SPECIALTIES	$ -	$ -	$ -	$ -
1728	WATER SPECIALTIES	$ -	$ -	$ -	$ -
1729	HUMIDIFIERS	$ -	$ -	$ -	$ -
1730	VIBRATION ISOLATION	$ -	$ -	$ -	$ -
1731	ACCESS DOORS	$ -	$ -	$ -	$ -
1732	NAME TAGS	$ -	$ -	$ -	$ -
1733	FLOW MEASURING DEVICES	$ -	$ -	$ -	$ -
1734	FREON	$ -	$ 26,652	$ -	$ 26,652
1735	WATER TREATMENT	$ -	$ -	$ -	$ -
1736	DUST COLLECTORS	$ -	$ -	$ -	$ -
1737	MAGNETIC STARTERS	$ -	$ -	$ -	$ -
1738	SMOKE DETECTORS	$ -	$ -	$ -	$ -
1739	FIRE STATS	$ -	$ -	$ -	$ -
1740	VFD'S	$ -	$ -	$ -	$ -
1741	THERMAL STORAGE TANKS	$ -	$ -	$ -	$ -
1742	HEAT EXCHANGERS	$ -	$ -	$ -	$ -
1743	GLYCOL	$ -	$ -	$ -	$ -
1744	PREMIUM EFFICIENCY MOTORS	$ -	$ -	$ -	$ -
1745	AIR COMPRESSORS	$ -	$ -	$ -	$ -
1746	REFRIGERANT MONITORS	$ -	$ -	$ -	$ -
1747	MEASUREMENT & VERIFICATION EQUIPMENT	$ -	$ -	$ -	$ -
1748		$ -	$ -	$ -	$ -
1749		$ -	$ -	$ -	$ -
1750		$ -	$ -	$ -	$ -
1751		$ -	$ -	$ -	$ -
1752		$ -	$ -	$ -	$ -

COST CODE	MECHANICAL PIPING SYSTEMS	CES/WAY PURCHASED EQUIP.	SUBCONT. PURCHASED EQUIP.	SUBCONT. PROVIDED LABOR	SUBCONT. TOTAL LAB & MATLS
1100	HW, CHW & CW PIPING	$ -	$ -	$ -	$ -
1101	FREON PIPING	$ -	$ 42,199	$ 38,035	$ 80,234
1102	DRAIN PIPING	$ -	$ -	$ -	$ -
1103	STEAM & CONDENSATE PIPING	$ -	$ -	$ -	$ -
1104	GAS PIPING	$ -	$ -	$ -	$ -
1105	HANGERS & SUPPORTS	$ -	$ -	$ -	$ -
1106	ESCUTCHEONS	$ -	$ -	$ -	$ -
1107	SLEEVES	$ -	$ -	$ -	$ -
1108	COOLING TOWER SUPPORTS	$ -	$ -	$ -	$ -
1109	PRE-INSULATED UG PIPING	$ -	$ -	$ -	$ -
1110	DEMOLITION	$ -	$ -	$ -	$ -
		$ -	$ -	$ -	$ -
		$ -	$ -	$ -	$ -
	SUBTOTAL CES/WAY EQUIP	$ 901,874			
	SUBTOTAL SUBCONT EQUIPT		$ 68,851		

PROJECT: Fort Leonard Wood
ECM: All Measures

ESTIMATED BY Petrosky
PRINT DATE 7/28/99
REV. DATE 8/12/98

REV #:

	SUBTOTAL SUBCONT LABOR			$ 266,242	
	SUBTOTAL SUBCONT.LAB & MATLS				$ 335,093

CODE	MECHANICAL SUBCONTRACTS	COSTS	NOTES
1201	INSULATION	$ -	
1202	CONTROLS	$ -	
1203	CONTROL WIRING	$ -	
1205	TEST & BALANCE	$ -	
1206	RIG RENT	$ -	
1207	TRENCHING	$ -	
1208	FOUNDATION & PADS	$ -	
1209	STARTUP	$ -	
1210	ELECTRICAL	$ -	
1211	CORE DRILLING	$ -	
1212	CARPENTRY	$ -	
1213	PAINTING	$ -	
1214	GENERAL CONSTRUCTION	$ -	
1215	HOT TAPS	$ -	
1216	DUCTWORK	$ 238,813	
1217	Refrigerant Recycling	$ 8,734	
1297	SUBTOTAL MECHANICAL SUBCONRACTS	$ 247,547	

CODE	PRIME SUBCONTRACTS	COSTS	NOTES
1202	EMS + TEMP CONTROLS	$ -	
1204	D&E COOLING TOWER	$ -	
1210	ELECTRICAL	$ -	
1214	GENERAL CONSTRUCTION	$ -	
1230	LIGHTING	$ -	
1231	MECHANICAL	$ -	
1232	PLUMBING	$ -	
1233	MAINTENANCE	$ -	
1234	WINDOW TINTING	$ -	
	WATER CONSERVATION	$ 234,090	
1298	SUBTOTAL PRIME SUBCONRACTS	$ 234,090	
1299	SUBTOTAL ALL SUBCONTRACTS	$ 481,637	

CODE	GENERAL & ADMINISTRATIVE COSTS				COST
1610	SMALL TOOLS & EXPENDABLES				$ 13,312
1608	DELIVERIES	(HOURS)			$ -
1603	BOOM TRUCK	(HOURS)			$ -
1904	EQUIPMENT RENTAL				$ -
	CUT-OFF SAW	(MONTHS)			$ -
	LADDERS	(QUANTITY)			$ -
	ROTARY HAMMERS	(MONTHS)			$ -
	PIPE MACHINE	(MONTHS)			$ -
	CHAIN VISE	(MONTHS)			$ -
	SCISSOR LIFT	(MONTHS)			$ -
	COME-ALONG	(MONTHS)			$ -
	CHAIN FALL	(MONTHS)			$ -
	ROUSTABOUT	(MONTHS)			$ -
	DOLLIES	(MONTHS)			$ -
	SKATE-15TON	(MONTHS)			$ -
	SKATE-30TON	(MONTHS)			$ -
	GANG BOX	(MONTHS)			$ -
	GAS WELDER	(MONTHS)			$ -
	ELECTRIC WELDER	(MONTHS)			$ -
	FORK LIFT	(MONTHS)			$ -
					$ -
					$ -
	SUBTOTAL RENTALS				$ -
	SUB'S NON-WORKING SUPERVISION				$ -
	SUB'S TOTAL G&A COSTS				$ 13,312

CODE	CES/WAY G&A COSTS	HRS/MOS	QTY	COST
1270	OUTSIDE MECHANICAL CONSULTANTS			$ -
1270	OUTSIDE ELECTRICAL CONSULTANTS			$ -
1271	OUTSIDE STRUCTURAL CONSULTANTS			$ -
1272	OUTSIDE ARCHITECT			$ -
1922	CES/WAY PROJECT MANAGEMENT (ECM SPECIFIC ONLY)			$ -

PROJECT: **Fort Leonard Wood**
ECM: **All Measures**

ESTIMATED BY **Petrosky**
PRINT DATE **7/28/99**
REV #: _____ REV. DATE **8/12/98**

1920	CES/WAY ENGINEERING			$	57,633
				$	-
1747	MEASUREMENT & VERIFICATION EQUIPMENT			$	52,885
1923	MEASUREMENT & VERIFICATION LABOR			$	38,866
1935	SITE FACILITIES			$	-
1933	TRAVEL & SUBSISTENCE			$	-
				$	-
	SUBTOTAL CES/WAY G&A			$	149,384

PROJECT: **Fort Leonard Wood**
ECM: **All Measures**

REV #:

ESTIMATED BY **Petrosky**
PRINT DATE **7/28/99**
REV. DATE **8/12/98**

COST CODE	MECHANICAL SUBCONTRACTS ESTIMATE SUMMARY SHEET	COSTS	REMARKS
	SUBCONTRACTOR FURNISHED EQUIPT	$ 68,851	
	SUBCONTRACTOR LABOR	$ 266,242	
	MECHANICAL SUBCONTRACTS	$ 247,547	
	SUB'S G&A COSTS	$ 13,312	
1925	SUBCONTRACTOR BONDS	$ 11,919	
	SUB'S OH&P	$ 91,181	34.2% of labor
	SUBCONTRACTOR SUBTOTAL	$ 699,052	
	PRIME SUBCONTRACTS	$ 234,090	
1925	PRIME SUBCONTRACTOR BONDS	$ -	
	SUBTOTAL	$ 933,142	
	CES/WAY FURNISHED EQUIPMENT	$ 901,874	
	CES/WAY G&A COSTS	$ 149,384	
	SUBTOTAL	$ 1,984,400	
	SALES TAX (EQUIPMENT)	$ 77,658	
	SALES TAX (LABOR)	$ -	
	WARRANTY	$ 9,707	
1931	BLDG PERMIT	$ -	
1980	CONTINGENCIES	$ 91,884	
	SUBTOTAL, ECM DIRECT COSTS	$ 2,163,649	

CLARIFICATIONS

1. Does Not Include Project Management
2. Does Not Include Audit Fee
3. Does not include Hazardous Waste Removal
4
5

TOTAL PROJECT ESTIMATE SUMMARY SHEET	COSTS	REMARKS
MECHANICAL SUBCONTRACT COSTS	$ 933,142	
MECHANICAL EQUIPMENT, DIRECT	$ 901,874	
MECHANICAL G&A	$ 149,384	
SUBTOTAL, MECHANICAL ECMS	**$ 1,984,400**	
LIGHTING SUBCONTRACT COSTS	$ -	
LIGHTING EQUIPMENT, DIRECT	$ -	
LIGHTING LABOR, DIRECT	$ -	
LIGHTING G&A	$ -	
SUBTOTAL, LIGHTING ECMS	**$ -**	
COMBINED SALES TAX, WARRANTY & PERMIT	$ 87,365	
COMBINED CONTINGENCY	$ 91,884	
SUBTOTAL, ALL DIRECT ECM COSTS	**$ 2,163,649**	
OVERALL PM + T&S	$ 187,864	
ENERGY AUDIT	$ 15,000	
NPV OF CONTINGENT SERVICE FEE	$ -	
SUBTOTAL, INDIRECT PROJECT COSTS	**$ 202,864**	
TOTAL PROJECT OH&P	**$ 899,897**	
TOTAL SELL PRICE	**$ 3,266,409**	Should Equal ECM Matrix $

CES/WAY INTE[illegible]TIONAL, INC.
ENERGY CON[illegible]TION ANALYSIS - 1997 SAVINGS CALCULATIONS

CUSTOMER NAME: Sample
FACILITY NAME: Facility Name
SERVICE ADDRESS: Facility Address

RUN DATE: 07/28/99
FILE NAME: SAMPLE.WB2

	1997 SAVINGS CALCULATIONS							
	ELECTRIC							
	KW					KWH TOTAL		
	UNITS					UNITS		
	BASE	1997	1997	RATES	$	BASE	1997	1997
MONTH	YEAR	ACTUAL	SAVINGS	$ / KW	SAVINGS	YEAR	ACTUAL	SAVINGS
JANUARY	2,330	1200	1,129.8	$7.64	$8,301	1,111,714	566,400	545,314
FEBRUARY	2,265	1188	1,076.8	$7.64	$8,227	1,197,279	514,800	682,479
MARCH	2,374	1092	1,282.0	$7.64	$9,582	896,059	559,200	336,859
APRIL	2,468	1056	1,412.5	$7.64	$10,791	882,938	489,600	393,338
MAY	2,534	1056	1,478.4	$7.64	$11,295	721,739	642,000	79,739
JUNE	2,443	1188	1,255.0	$12.98	$16,290	918,931	484,800	434,131
JULY	2,453	1332	1,120.8	$12.98	$14,548	847,478	703,200	144,278
AUGUST	2,531	1428	1,103.3	$12.98	$14,321	1,054,642	586,800	467,842
SEPTEMBER	2,331	1428	902.6	$12.98	$11,715	981,264	774,000	207,264
OCTOBER	2,297	1200	1,096.8	$7.64	$8,380	828,901	498,000	330,901
NOVEMBER	1,959	1116	842.9	$7.64	$6,440	916,283	562,800	353,483
DECEMBER	1,799	1200	599.0	$7.64	$4,576	941,534	567,600	373,934
TOTAL	27,784	14484	13,299.9		$124,466	11,298,760	6,949,200	4,349,560

CES/WAY INTERNATIONAL, INC.
ENERGY CONSERVATION ANALYSIS - 1997 SAVINGS CALCULATIONS

CUSTOMER NAME: Sample
FACILITY NAME: Facility Name
SERVICE ADDRESS: Facility Address

RUN DATE: 07/28/99
FILE NAME: SAMPLE.WB2

	1997 SAVINGS CALCULATIONS										
	ELECTRIC										TOTAL ELECTRIC SAVINGS $
	KWH "OFF PEAK"					KWH "ON PEAK"					
	UNITS					UNITS					
MONTH	BASE YEAR	1997 ACTUAL	1997 SAVINGS	RATES $ / KWH	$ SAVINGS	BASE YEAR	1997 ACTUAL	1997 SAVINGS	RATES $ / KWH	$ SAVINGS	
JANUARY	844,160	450,000	394,160	$0.0220	$8,678	267,554	138,000	129,554	$0.0434	$5,619	$22,597
FEBRUARY	910,275	382,800	527,475	$0.0220	$11,613	287,004	132,000	155,004	$0.0434	$6,723	$26,562
MARCH	687,187	354,000	333,187	$0.0220	$7,335	208,872	118,800	90,072	$0.0434	$3,906	$20,824
APRIL	667,301	372,000	295,301	$0.0220	$6,501	215,637	117,600	98,037	$0.0434	$4,252	$21,545
MAY	564,456	510,000	54,456	$0.0220	$1,199	157,283	132,000	25,283	$0.0434	$1,097	$13,591
JUNE	658,360	355,200	303,160	$0.0220	$6,670	260,570	129,600	130,970	$0.0433	$5,676	$28,636
JULY	520,570	507,600	12,970	$0.0220	$285	326,908	195,600	131,308	$0.0427	$5,604	$20,437
AUGUST	654,425	424,800	229,625	$0.0220	$5,052	400,217	162,000	238,217	$0.0427	$10,167	$29,539
SEPTEMBER	617,105	558,000	59,105	$0.0220	$1,300	364,159	216,000	148,159	$0.0427	$6,323	$19,339
OCTOBER	656,199	381,600	274,599	$0.0220	$6,041	172,702	116,400	56,302	$0.0427	$2,403	$16,824
NOVEMBER	676,510	434,400	242,110	$0.0220	$5,326	239,773	128,400	111,373	$0.0427	$4,761	$16,527
DECEMBER	705,733	446,400	259,333	$0.0220	$5,705	235,801	121,200	114,601	$0.0427	$4,899	$15,181
TOTAL	8,162,282	5,176,800	2,985,482		$65,706	3,136,478	1,707,600	1,428,878		$61,430	$251,602
DD ADJ *			0	$0.0220	$0			0	$0.0427	$0	$0

* ANNUAL DEGREE DAY ADJUSTMENT

CES/WAY INTERNATIONAL, INC.
ENERGY CONSERVATION ANALYSIS - 1997 SAVINGS CALCULATIONS

CUSTOMER NAME: Sample
FACILITY NAME: Facility Name
SERVICE ADDRESS: Facility Address

RUN DATE: 07/28/99
FILE NAME: SAMPLE.WB2

	1997 SAVINGS CALCULATIONS									
	GAS					WATER				
	THERMS					GALLONS				
	UNITS					UNITS				
MONTH	BASE YEAR	1997 ACTUAL	1997 SAVINGS	RATES $ / THERM	$ SAVINGS	BASE YEAR	1997 ACTUAL	1997 SAVINGS	RATES $ / GAL	$ SAVINGS
JANUARY	58,131	40,908	17,223	$0.5112	$8,804	6,230	2,338	3,892	1.45	$5,643
FEBRUARY	54,627	25,726	28,901	$0.4920	$14,219	6,272	3,511	2,761	1.45	$4,003
MARCH	30,876	22,671	8,205	$0.4920	$4,037	3,809	2,783	1,026	1.45	$1,488
APRIL	26,866	10,502	16,364	$0.4920	$8,051	6,237	3,109	3,128	1.45	$4,536
MAY	3,325	3,848	(523)	$0.5068	($265)	4,299	3,956	$343	1.45	$497
JUNE	4,783	2,598	2,185	$0.5463	$1,194	2,274	1,096	$1,178	1.45	$1,708
JULY	154	2,278	(2,124)	$0.5969	($1,268)	3,052	1,942	$1,110	1.45	$1,610
AUGUST	813	5,850	(5,037)	$0.5148	($2,593)	1,729	1,481	$248	1.45	$360
SEPTEMBER	1,578	9,203	(7,625)	$0.5251	($4,004)	3,089	3,039	$50	1.45	$73
OCTOBER	26,919	15,069	11,850	$0.5796	$6,869	3,891	3,221	$670	1.45	$972
NOVEMBER	33,363	32,275	1,088	$0.5580	$607	4,077	3,748	$329	1.45	$477
DECEMBER	46,421	34,621	11,800	$0.6095	$7,191	2,648	1,872	$776	1.45	$1,125
TOTAL	287,856	205,549	82,307		$42,843	47,607	32,096	15,511		$22,491

CES/WAY INTERNATIONAL, INC.
ENERGY CONSERVATION ANALYSIS - 1997 SAVINGS CALCULATIONS

CUSTOMER NAME: Sample
FACILITY NAME: Facility Name
SERVICE ADDRESS: Facility Address

RUN DATE: 07/28/99
FILE NAME: SAMPLE.WB2

MONTH	1997 TOTAL SAVINGS $ ELECTRIC	$ GAS	$ WATER	$ OIL	$ MAINTENANCE	GRAND TOTAL $ SAVINGS	GRAND TOTAL $ SAVINGS CUMULATIVE
JANUARY	$22,597	$8,804	$5,643	$377	$2,167	$39,589	$39,589
FEBRUARY	$26,562	$14,219	$4,003	$0	$2,167	$46,952	$86,541
MARCH	$20,824	$4,037	$1,488	$376	$2,167	$28,891	$115,432
APRIL	$21,545	$8,051	$4,536	$0	$2,167	$36,298	$151,730
MAY	$13,591	($265)	$497	$0	$2,167	$15,990	$167,720
JUNE	$28,636	$1,194	$1,708	$0	$2,167	$33,704	$201,424
JULY	$20,437	($1,268)	$1,610	$655	$2,167	$23,601	$225,026
AUGUST	$29,539	($2,593)	$360	$0	$2,167	$29,473	$254,499
SEPTEMBER	$19,339	($4,004)	$73	$197	$2,167	$17,771	$272,270
OCTOBER	$16,824	$6,869	$972	$0	$2,167	$26,832	$299,101
NOVEMBER	$16,527	$607	$477	$6,006	$2,167	$25,785	$324,886
DECEMBER	$15,181	$7,191	$1,125	$5,494	$2,167	$31,158	$356,044
TOTAL	$251,602	$42,843	$22,491	$13,105	$26,004	$356,044	

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CES/WAY INTE[illegible]TIONAL, INC.
ENERGY CON[illegible]TION ANALYSIS - 1997 ENERGY SAVINGS

CUSTOMER NAME: Sample
FACILITY NAME: Facility Name
SERVICE ADDRESS: Facility Address

RUN DATE: 07/28/99
FILE NAME: SAMPLE.WB2

MONTH	1997 SAVINGS BREAKDOWN TOTAL $ SAVINGS	DEBT SERVICE	EXCESS SAVINGS		M&V FEE	TOTAL $ DUE CES/WAY
JANUARY	$39,589	$14,778	$24,811		$3,931	$3,931
FEBRUARY	$46,952	$14,778	$32,174		$3,931	$3,931
MARCH	$28,891	$14,778	$14,113		$3,931	$3,931
APRIL	$36,298	$14,778	$21,520		$3,931	$3,931
MAY	$15,990	$14,778	$1,212		$3,931	$3,931
JUNE	$33,704	$14,778	$18,926		$3,931	$3,931
JULY	$23,601	$14,778	$8,823		$3,931	$3,931
AUGUST	$29,473	$14,778	$14,695		$3,931	$3,931
SEPTEMBER	$17,771	$14,778	$2,993		$3,931	$3,931
OCTOBER	$26,832	$14,778	$12,054		$3,931	$3,931
NOVEMBER	$25,785	$14,778	$11,007		$3,931	$3,931
DECEMBER	$31,158	$14,778	$16,380		$3,931	$3,931
TOTAL	$356,044	$177,336	$178,708		$47,172	$47,172

YEARLY DD ADJ	($7,802)					
TTL AFTER ADJ	$348,242	$177,336	$170,906		$47,172	$47,172

Appendix K

Buyout Schedule

CES/Way International, Inc.

Cancellation Ceilings		
YEAR	TIME PERIOD	CANCELLATION CEILING ($)
0	After Installation and Acceptance of ECMs	$3,746,130
1	After ECM Acceptance - End of Year One	$3,591,861
2	After ECM Acceptance - End of Year Two	$3,448,444
3	After ECM Acceptance - End of Year Three	$3,292,880
4	After ECM Acceptance - End of Year Four	$3,124,139
5	After ECM Acceptance - End of Year Five	$2,941,106
6	After ECM Acceptance - End of Year Six	$2,742,570
7	After ECM Acceptance - End of Year Seven	$2,527,218
8	After ECM Acceptance - End of Year Eight	$2,293,625
9	After ECM Acceptance - End of Year Nine	$2,040,247
10	After ECM Acceptance - End of Year Ten	$1,765,408
11	After ECM Acceptance - End of Year Eleven	$1,467,290
12	After ECM Acceptance - End of Year Twelve	$1,143,921
13	After ECM Acceptance - End of Year Thirteen	$793,162
14	After ECM Acceptance - End of Year Fourteen	$412,694

Year	Month	Beg Prin Bal	Pmt	Int	Prin	End Prin Bal	Penalty	After Payment Termination Fee by Month
1	1	$3,385,526	($32,663)	($23,016)	($9,647)	$3,375,879	$337,587.86	**$3,713,466**
1	2	$3,375,879	($32,663)	($22,950)	($9,713)	$3,366,166	$336,616.55	**$3,702,782**
1	3	$3,366,166	($32,663)	($22,884)	($9,779)	$3,356,386	$335,638.64	**$3,692,025**
1	4	$3,356,386	($32,663)	($22,818)	($9,846)	$3,346,541	$334,654.08	**$3,681,195**
1	5	$3,346,541	($32,663)	($22,751)	($9,913)	$3,336,628	$333,662.83	**$3,670,291**
1	6	$3,336,628	($32,663)	($22,684)	($9,980)	$3,326,648	$332,664.84	**$3,659,313**
1	7	$3,326,648	($32,663)	($22,616)	($10,048)	$3,316,601	$331,660.07	**$3,648,261**
1	8	$3,316,601	($32,663)	($22,547)	($10,116)	$3,306,485	$330,648.46	**$3,637,133**
1	9	$3,306,485	($32,663)	($22,479)	($10,185)	$3,296,300	$329,629.98	**$3,625,930**
1	10	$3,296,300	($32,663)	($22,409)	($10,254)	$3,286,046	$328,604.58	**$3,614,650**
1	11	$3,286,046	($32,663)	($22,340)	($10,324)	$3,275,722	$327,572.20	**$3,603,294**
1	12	$3,275,722	($32,663)	($22,269)	($10,394)	$3,265,328	$326,532.80	**$3,591,861**
2	13	$3,265,328	($32,663)	($22,199)	($10,465)	$3,254,863	$325,486.34	**$3,580,350**
2	14	$3,254,863	($32,663)	($22,128)	($10,536)	$3,244,328	$324,432.76	**$3,568,760**
2	15	$3,244,328	($32,663)	($22,056)	($10,607)	$3,233,720	$323,372.02	**$3,557,092**
2	16	$3,233,720	($32,663)	($21,984)	($10,680)	$3,223,041	$322,304.07	**$3,545,345**
2	17	$3,223,041	($32,663)	($21,911)	($10,752)	$3,212,289	$321,228.86	**$3,533,517**
2	18	$3,212,289	($32,663)	($21,838)	($10,825)	$3,201,463	$320,146.34	**$3,521,610**
2	19	$3,201,463	($32,663)	($21,765)	($10,899)	$3,190,565	$319,056.46	**$3,509,621**
2	20	$3,190,565	($32,663)	($21,691)	($10,973)	$3,179,592	$317,959.17	**$3,497,551**
2	21	$3,179,592	($32,663)	($21,616)	($11,047)	$3,168,544	$316,854.43	**$3,485,399**
2	22	$3,168,544	($32,663)	($21,541)	($11,123)	$3,157,422	$315,742.17	**$3,473,164**
2	23	$3,157,422	($32,663)	($21,465)	($11,198)	$3,146,223	$314,622.35	**$3,460,846**
2	24	$3,146,223	($32,663)	($21,389)	($11,274)	$3,134,949	$313,494.91	**$3,448,444**
3	25	$3,134,949	($32,663)	($21,312)	($11,351)	$3,123,598	$312,359.81	**$3,435,958**
3	26	$3,123,598	($32,663)	($21,235)	($11,428)	$3,112,170	$311,217.00	**$3,423,387**
3	27	$3,112,170	($32,663)	($21,158)	($11,506)	$3,100,664	$310,066.42	**$3,410,731**
3	28	$3,100,664	($32,663)	($21,079)	($11,584)	$3,089,080	$308,908.01	**$3,397,988**
3	29	$3,089,080	($32,663)	($21,001)	($11,663)	$3,077,417	$307,741.73	**$3,385,159**
3	30	$3,077,417	($32,663)	($20,921)	($11,742)	$3,065,675	$306,567.52	**$3,372,243**
3	31	$3,065,675	($32,663)	($20,841)	($11,822)	$3,053,853	$305,385.32	**$3,359,239**
3	32	$3,053,853	($32,663)	($20,761)	($11,902)	$3,041,951	$304,195.10	**$3,346,146**
3	33	$3,041,951	($32,663)	($20,680)	($11,983)	$3,029,968	$302,996.77	**$3,332,965**
3	34	$3,029,968	($32,663)	($20,599)	($12,065)	$3,017,903	$301,790.31	**$3,319,693**
3	35	$3,017,903	($32,663)	($20,517)	($12,147)	$3,005,756	$300,575.64	**$3,306,332**
3	36	$3,005,756	($32,663)	($20,434)	($12,229)	$2,993,527	$299,352.71	**$3,292,880**
4	37	$2,993,527	($32,663)	($20,351)	($12,312)	$2,981,215	$298,121.47	**$3,279,336**
4	38	$2,981,215	($32,663)	($20,267)	($12,396)	$2,968,819	$296,881.85	**$3,265,700**
4	39	$2,968,819	($32,663)	($20,183)	($12,480)	$2,956,338	$295,633.82	**$3,251,972**
4	40	$2,956,338	($32,663)	($20,098)	($12,565)	$2,943,773	$294,377.29	**$3,238,150**
4	41	$2,943,773	($32,663)	($20,013)	($12,651)	$2,931,122	$293,112.23	**$3,224,234**
4	42	$2,931,122	($32,663)	($19,927)	($12,737)	$2,918,386	$291,838.56	**$3,210,224**
4	43	$2,918,386	($32,663)	($19,840)	($12,823)	$2,905,562	$290,556.23	**$3,196,119**
4	44	$2,905,562	($32,663)	($19,753)	($12,910)	$2,892,652	$289,265.19	**$3,181,917**
4	45	$2,892,652	($32,663)	($19,665)	($12,998)	$2,879,654	$287,965.37	**$3,167,619**
4	46	$2,879,654	($32,663)	($19,577)	($13,087)	$2,866,567	$286,656.71	**$3,153,224**

4	47	$2,866,567	($32,663)	($19,488)	($13,176)	$2,853,392	$285,339.16	**$3,138,731**
4	48	$2,853,392	($32,663)	($19,398)	($13,265)	$2,840,127	$284,012.65	**$3,124,139**
5	49	$2,840,127	($32,663)	($19,308)	($13,355)	$2,826,771	$282,677.12	**$3,109,448**
5	50	$2,826,771	($32,663)	($19,217)	($13,446)	$2,813,325	$281,332.51	**$3,094,658**
5	51	$2,813,325	($32,663)	($19,126)	($13,537)	$2,799,788	$279,978.77	**$3,079,766**
5	52	$2,799,788	($32,663)	($19,034)	($13,630)	$2,786,158	$278,615.81	**$3,064,774**
5	53	$2,786,158	($32,663)	($18,941)	($13,722)	$2,772,436	$277,243.60	**$3,049,680**
5	54	$2,772,436	($32,663)	($18,848)	($13,815)	$2,758,620	$275,862.05	**$3,034,483**
5	55	$2,758,620	($32,663)	($18,754)	($13,909)	$2,744,711	$274,471.11	**$3,019,182**
5	56	$2,744,711	($32,663)	($18,659)	($14,004)	$2,730,707	$273,070.72	**$3,003,778**
5	57	$2,730,707	($32,663)	($18,564)	($14,099)	$2,716,608	$271,660.80	**$2,988,269**
5	58	$2,716,608	($32,663)	($18,468)	($14,195)	$2,702,413	$270,241.30	**$2,972,654**
5	59	$2,702,413	($32,663)	($18,372)	($14,292)	$2,688,121	$268,812.15	**$2,956,934**
5	60	$2,688,121	($32,663)	($18,275)	($14,389)	$2,673,733	$267,373.28	**$2,941,106**
6	61	$2,673,733	($32,663)	($18,177)	($14,486)	$2,659,246	$265,924.63	**$2,925,171**
6	62	$2,659,246	($32,663)	($18,078)	($14,585)	$2,644,661	$264,466.14	**$2,909,128**
6	63	$2,644,661	($32,663)	($17,979)	($14,684)	$2,629,977	$262,997.73	**$2,892,975**
6	64	$2,629,977	($32,663)	($17,879)	($14,784)	$2,615,193	$261,519.33	**$2,876,713**
6	65	$2,615,193	($32,663)	($17,779)	($14,884)	$2,600,309	$260,030.89	**$2,860,340**
6	66	$2,600,309	($32,663)	($17,678)	($14,986)	$2,585,323	$258,532.32	**$2,843,856**
6	67	$2,585,323	($32,663)	($17,576)	($15,088)	$2,570,236	$257,023.57	**$2,827,259**
6	68	$2,570,236	($32,663)	($17,473)	($15,190)	$2,555,046	$255,504.56	**$2,810,550**
6	69	$2,555,046	($32,663)	($17,370)	($15,293)	$2,539,752	$253,975.22	**$2,793,727**
6	70	$2,539,752	($32,663)	($17,266)	($15,397)	$2,524,355	$252,435.49	**$2,776,790**
6	71	$2,524,355	($32,663)	($17,161)	($15,502)	$2,508,853	$250,885.29	**$2,759,738**
6	72	$2,508,853	($32,663)	($17,056)	($15,607)	$2,493,246	$249,324.55	**$2,742,570**
7	73	$2,493,246	($32,663)	($16,950)	($15,713)	$2,477,532	$247,753.20	**$2,725,285**
7	74	$2,477,532	($32,663)	($16,843)	($15,820)	$2,461,712	$246,171.17	**$2,707,883**
7	75	$2,461,712	($32,663)	($16,736)	($15,928)	$2,445,784	$244,578.38	**$2,690,362**
7	76	$2,445,784	($32,663)	($16,627)	($16,036)	$2,429,748	$242,974.77	**$2,672,722**
7	77	$2,429,748	($32,663)	($16,518)	($16,145)	$2,413,602	$241,360.25	**$2,654,963**
7	78	$2,413,602	($32,663)	($16,408)	($16,255)	$2,397,348	$239,734.75	**$2,637,082**
7	79	$2,397,348	($32,663)	($16,298)	($16,365)	$2,380,982	$238,098.21	**$2,619,080**
7	80	$2,380,982	($32,663)	($16,187)	($16,477)	$2,364,505	$236,450.54	**$2,600,956**
7	81	$2,364,505	($32,663)	($16,075)	($16,589)	$2,347,917	$234,791.67	**$2,582,708**
7	82	$2,347,917	($32,663)	($15,962)	($16,701)	$2,331,215	$233,121.52	**$2,564,337**
7	83	$2,331,215	($32,663)	($15,848)	($16,815)	$2,314,400	$231,440.02	**$2,545,840**
7	84	$2,314,400	($32,663)	($15,734)	($16,929)	$2,297,471	$229,747.08	**$2,527,218**
8	85	$2,297,471	($32,663)	($15,619)	($17,044)	$2,280,426	$228,042.64	**$2,508,469**
8	86	$2,280,426	($32,663)	($15,503)	($17,160)	$2,263,266	$226,326.61	**$2,489,593**
8	87	$2,263,266	($32,663)	($15,386)	($17,277)	$2,245,989	$224,598.91	**$2,470,588**
8	88	$2,245,989	($32,663)	($15,269)	($17,394)	$2,228,595	$222,859.47	**$2,451,454**
8	89	$2,228,595	($32,663)	($15,151)	($17,513)	$2,211,082	$221,108.20	**$2,432,190**
8	90	$2,211,082	($32,663)	($15,032)	($17,632)	$2,193,450	$219,345.03	**$2,412,795**
8	91	$2,193,450	($32,663)	($14,912)	($17,752)	$2,175,699	$217,569.86	**$2,393,269**
8	92	$2,175,699	($32,663)	($14,791)	($17,872)	$2,157,826	$215,782.64	**$2,373,609**
8	93	$2,157,826	($32,663)	($14,670)	($17,994)	$2,139,833	$213,983.26	**$2,353,816**
8	94	$2,139,833	($32,663)	($14,547)	($18,116)	$2,121,716	$212,171.65	**$2,333,888**
8	95	$2,121,716	($32,663)	($14,424)	($18,239)	$2,103,477	$210,347.72	**$2,313,825**

8	96	$2,103,477	($32,663)	($14,300)	($18,363)	$2,085,114	$208,511.39	**$2,293,625**
9	97	$2,085,114	($32,663)	($14,175)	($18,488)	$2,066,626	$206,662.58	**$2,273,288**
9	98	$2,066,626	($32,663)	($14,050)	($18,614)	$2,048,012	$204,801.20	**$2,252,813**
9	99	$2,048,012	($32,663)	($13,923)	($18,740)	$2,029,272	$202,927.17	**$2,232,199**
9	100	$2,029,272	($32,663)	($13,796)	($18,868)	$2,010,404	$201,040.39	**$2,211,444**
9	101	$2,010,404	($32,663)	($13,667)	($18,996)	$1,991,408	$199,140.79	**$2,190,549**
9	102	$1,991,408	($32,663)	($13,538)	($19,125)	$1,972,283	$197,228.27	**$2,169,511**
9	103	$1,972,283	($32,663)	($13,408)	($19,255)	$1,953,028	$195,302.76	**$2,148,330**
9	104	$1,953,028	($32,663)	($13,277)	($19,386)	$1,933,641	$193,364.15	**$2,127,006**
9	105	$1,933,641	($32,663)	($13,146)	($19,518)	$1,914,124	$191,412.36	**$2,105,536**
9	106	$1,914,124	($32,663)	($13,013)	($19,651)	$1,894,473	$189,447.31	**$2,083,920**
9	107	$1,894,473	($32,663)	($12,879)	($19,784)	$1,874,689	$187,468.89	**$2,062,158**
9	108	$1,874,689	($32,663)	($12,745)	($19,919)	$1,854,770	$185,477.03	**$2,040,247**
10	109	$1,854,770	($32,663)	($12,609)	($20,054)	$1,834,716	$183,471.62	**$2,018,188**
10	110	$1,834,716	($32,663)	($12,473)	($20,190)	$1,814,526	$181,452.58	**$1,995,978**
10	111	$1,814,526	($32,663)	($12,336)	($20,328)	$1,794,198	$179,419.81	**$1,973,618**
10	112	$1,794,198	($32,663)	($12,198)	($20,466)	$1,773,732	$177,373.23	**$1,951,106**
10	113	$1,773,732	($32,663)	($12,058)	($20,605)	$1,753,127	$175,312.73	**$1,928,440**
10	114	$1,753,127	($32,663)	($11,918)	($20,745)	$1,732,382	$173,238.22	**$1,905,620**
10	115	$1,732,382	($32,663)	($11,777)	($20,886)	$1,711,496	$171,149.61	**$1,882,646**
10	116	$1,711,496	($32,663)	($11,635)	($21,028)	$1,690,468	$169,046.80	**$1,859,515**
10	117	$1,690,468	($32,663)	($11,492)	($21,171)	$1,669,297	$166,929.70	**$1,836,227**
10	118	$1,669,297	($32,663)	($11,348)	($21,315)	$1,647,982	$164,798.20	**$1,812,780**
10	119	$1,647,982	($32,663)	($11,204)	($21,460)	$1,626,522	$162,652.21	**$1,789,174**
10	120	$1,626,522	($32,663)	($11,058)	($21,606)	$1,604,916	$160,491.64	**$1,765,408**
11	121	$1,604,916	($32,663)	($10,911)	($21,753)	$1,583,164	$158,316.37	**$1,741,480**
11	122	$1,583,164	($32,663)	($10,763)	($21,901)	$1,561,263	$156,126.32	**$1,717,390**
11	123	$1,561,263	($32,663)	($10,614)	($22,049)	$1,539,214	$153,921.38	**$1,693,135**
11	124	$1,539,214	($32,663)	($10,464)	($22,199)	$1,517,014	$151,701.44	**$1,668,716**
11	125	$1,517,014	($32,663)	($10,313)	($22,350)	$1,494,664	$149,466.42	**$1,644,131**
11	126	$1,494,664	($32,663)	($10,161)	($22,502)	$1,472,162	$147,216.20	**$1,619,378**
11	127	$1,472,162	($32,663)	($10,008)	($22,655)	$1,449,507	$144,950.68	**$1,594,458**
11	128	$1,449,507	($32,663)	($9,854)	($22,809)	$1,426,698	$142,669.77	**$1,569,367**
11	129	$1,426,698	($32,663)	($9,699)	($22,964)	$1,403,733	$140,373.34	**$1,544,107**
11	130	$1,403,733	($32,663)	($9,543)	($23,120)	$1,380,613	$138,061.31	**$1,518,674**
11	131	$1,380,613	($32,663)	($9,386)	($23,278)	$1,357,336	$135,733.55	**$1,493,069**
11	132	$1,357,336	($32,663)	($9,228)	($23,436)	$1,333,900	$133,389.97	**$1,467,290**
12	133	$1,333,900	($32,663)	($9,068)	($23,595)	$1,310,305	$131,030.46	**$1,441,335**
12	134	$1,310,305	($32,663)	($8,908)	($23,756)	$1,286,549	$128,654.91	**$1,415,204**
12	135	$1,286,549	($32,663)	($8,746)	($23,917)	$1,262,632	$126,263.21	**$1,388,895**
12	136	$1,262,632	($32,663)	($8,584)	($24,080)	$1,238,552	$123,855.25	**$1,362,408**
12	137	$1,238,552	($32,663)	($8,420)	($24,243)	$1,214,309	$121,430.91	**$1,335,740**
12	138	$1,214,309	($32,663)	($8,255)	($24,408)	$1,189,901	$118,990.10	**$1,308,891**
12	139	$1,189,901	($32,663)	($8,089)	($24,574)	$1,165,327	$116,532.69	**$1,281,860**
12	140	$1,165,327	($32,663)	($7,922)	($24,741)	$1,140,586	$114,058.58	**$1,254,644**
12	141	$1,140,586	($32,663)	($7,754)	($24,909)	$1,115,676	$111,567.65	**$1,227,244**
12	142	$1,115,676	($32,663)	($7,585)	($25,079)	$1,090,598	$109,059.78	**$1,199,658**
12	143	$1,090,598	($32,663)	($7,414)	($25,249)	$1,065,349	$106,534.86	**$1,171,884**
12	144	$1,065,349	($32,663)	($7,243)	($25,421)	$1,039,928	$103,992.78	**$1,143,921**

13	145	$1,039,928	($32,663)	($7,070)	($25,594)	$1,014,334	$101,433.42	**$1,115,768**
13	146	$1,014,334	($32,663)	($6,896)	($25,768)	$988,567	$98,856.66	**$1,087,423**
13	147	$988,567	($32,663)	($6,721)	($25,943)	$962,624	$96,262.38	**$1,058,886**
13	148	$962,624	($32,663)	($6,544)	($26,119)	$936,505	$93,650.46	**$1,030,155**
13	149	$936,505	($32,663)	($6,367)	($26,297)	$910,208	$91,020.78	**$1,001,229**
13	150	$910,208	($32,663)	($6,188)	($26,476)	$883,732	$88,373.23	**$972,106**
13	151	$883,732	($32,663)	($6,008)	($26,656)	$857,077	$85,707.68	**$942,785**
13	152	$857,077	($32,663)	($5,827)	($26,837)	$830,240	$83,024.01	**$913,264**
13	153	$830,240	($32,663)	($5,644)	($27,019)	$803,221	$80,322.10	**$883,543**
13	154	$803,221	($32,663)	($5,461)	($27,203)	$776,018	$77,601.81	**$853,620**
13	155	$776,018	($32,663)	($5,276)	($27,388)	$748,630	$74,863.03	**$823,493**
13	156	$748,630	($32,663)	($5,089)	($27,574)	$721,056	$72,105.64	**$793,162**
14	157	$721,056	($32,663)	($4,902)	($27,761)	$693,295	$69,329.49	**$762,624**
14	158	$693,295	($32,663)	($4,713)	($27,950)	$665,345	$66,534.48	**$731,879**
14	159	$665,345	($32,663)	($4,523)	($28,140)	$637,205	$63,720.46	**$700,925**
14	160	$637,205	($32,663)	($4,332)	($28,331)	$608,873	$60,887.31	**$669,760**
14	161	$608,873	($32,663)	($4,139)	($28,524)	$580,349	$58,034.90	**$638,384**
14	162	$580,349	($32,663)	($3,945)	($28,718)	$551,631	$55,163.10	**$606,794**
14	163	$551,631	($32,663)	($3,750)	($28,913)	$522,718	$52,271.78	**$574,990**
14	164	$522,718	($32,663)	($3,554)	($29,110)	$493,608	$49,360.80	**$542,969**
14	165	$493,608	($32,663)	($3,356)	($29,308)	$464,300	$46,430.03	**$510,730**
14	166	$464,300	($32,663)	($3,156)	($29,507)	$434,793	$43,479.33	**$478,273**
14	167	$434,793	($32,663)	($2,956)	($29,708)	$405,086	$40,508.58	**$445,594**
14	168	$405,086	($32,663)	($2,754)	($29,910)	$375,176	$37,517.63	**$412,694**
15	169	$375,176	($32,663)	($2,551)	($30,113)	$345,063	$34,506.35	**$379,570**
15	170	$345,063	($32,663)	($2,346)	($30,318)	$314,746	$31,474.59	**$346,220**
15	171	$314,746	($32,663)	($2,140)	($30,524)	$284,222	$28,422.22	**$312,644**
15	172	$284,222	($32,663)	($1,932)	($30,731)	$253,491	$25,349.11	**$278,840**
15	173	$253,491	($32,663)	($1,723)	($30,940)	$222,551	$22,255.10	**$244,806**
15	174	$222,551	($32,663)	($1,513)	($31,150)	$191,401	$19,140.05	**$210,541**
15	175	$191,401	($32,663)	($1,301)	($31,362)	$160,038	$16,003.83	**$176,042**
15	176	$160,038	($32,663)	($1,088)	($31,575)	$128,463	$12,846.29	**$141,309**
15	177	$128,463	($32,663)	($873)	($31,790)	$96,673	$9,667.28	**$106,340**
15	178	$96,673	($32,663)	($657)	($32,006)	$64,667	$6,466.66	**$71,133**
15	179	$64,667	($32,663)	($440)	($32,224)	$32,443	$3,244.29	**$35,687**
15	180	$32,443	($32,663)	($221)	($32,443)	($0)	($0.00)	**($0)**